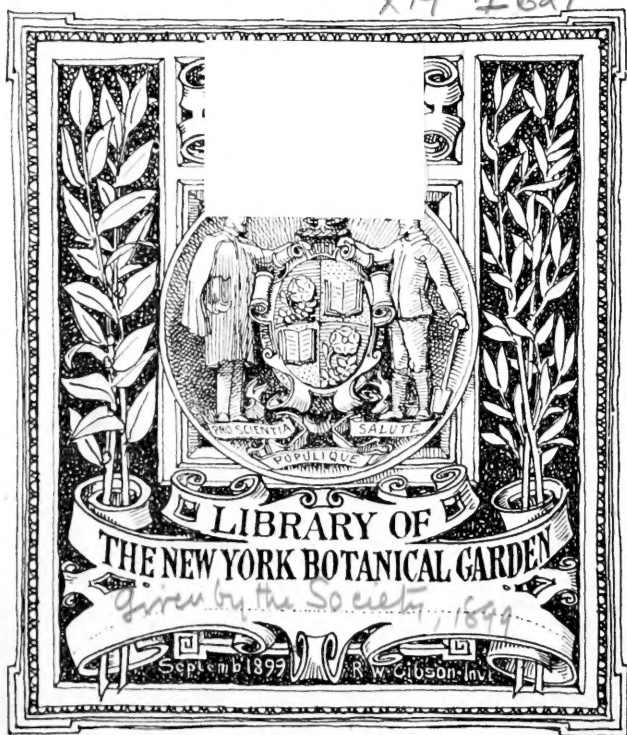
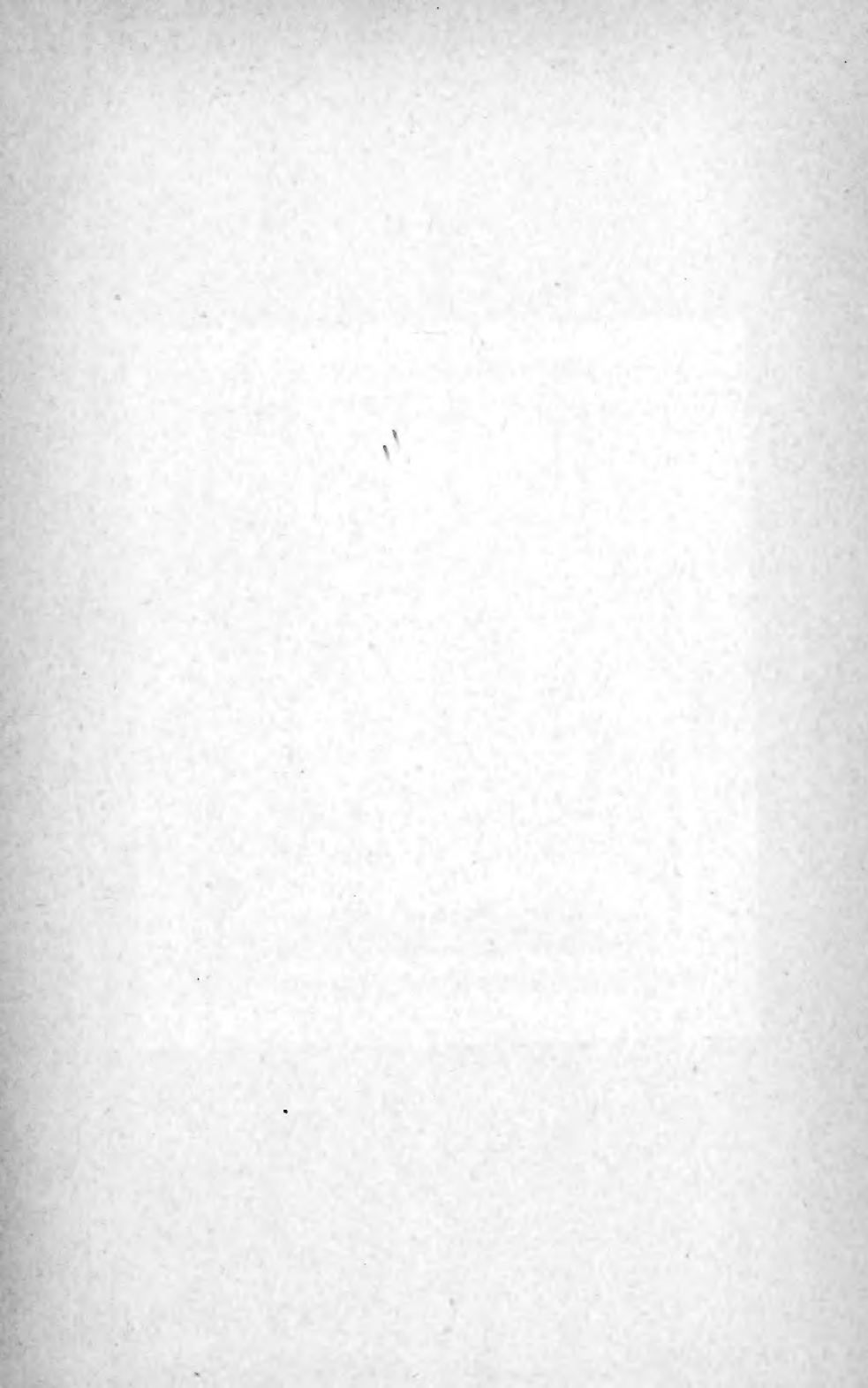
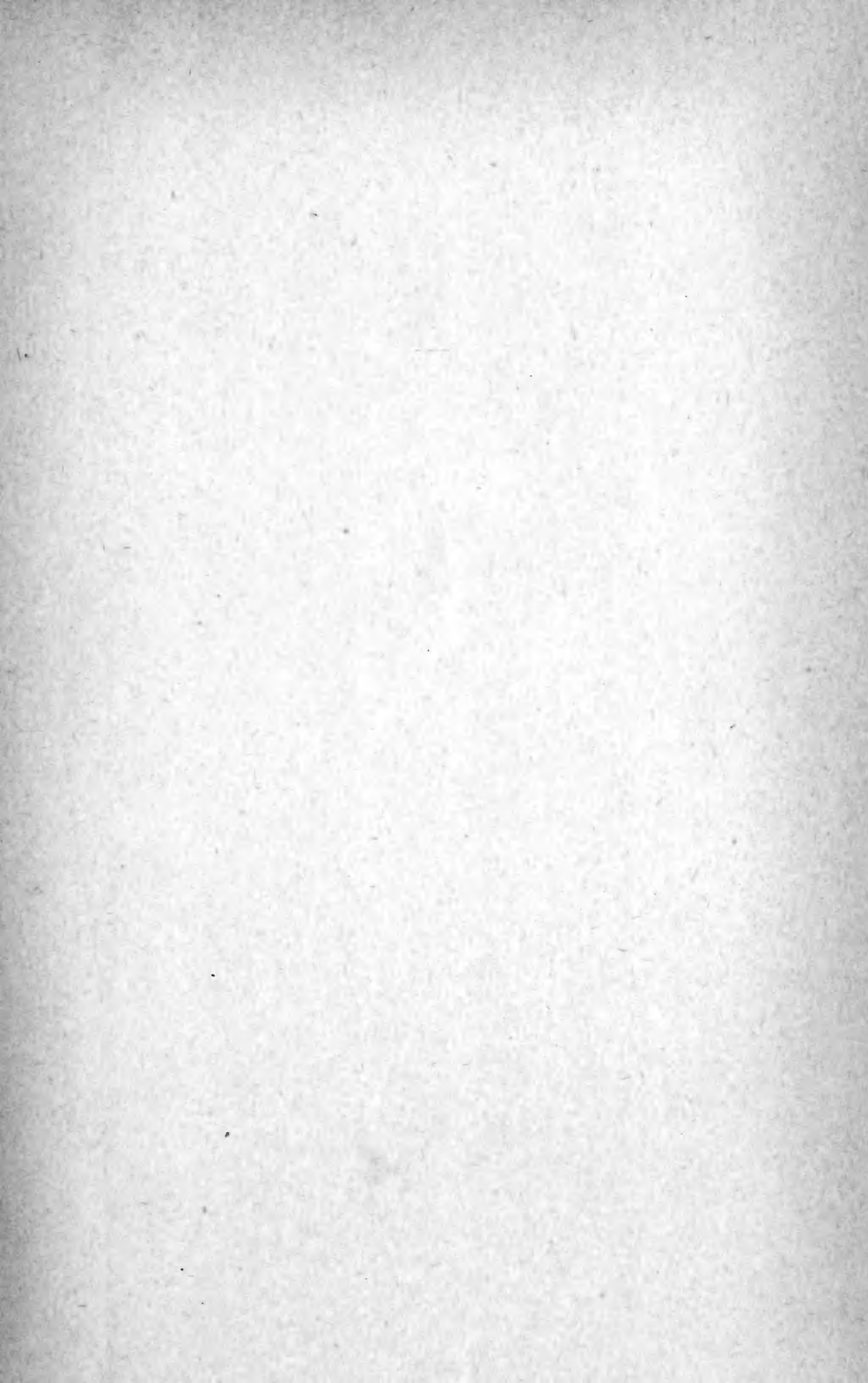
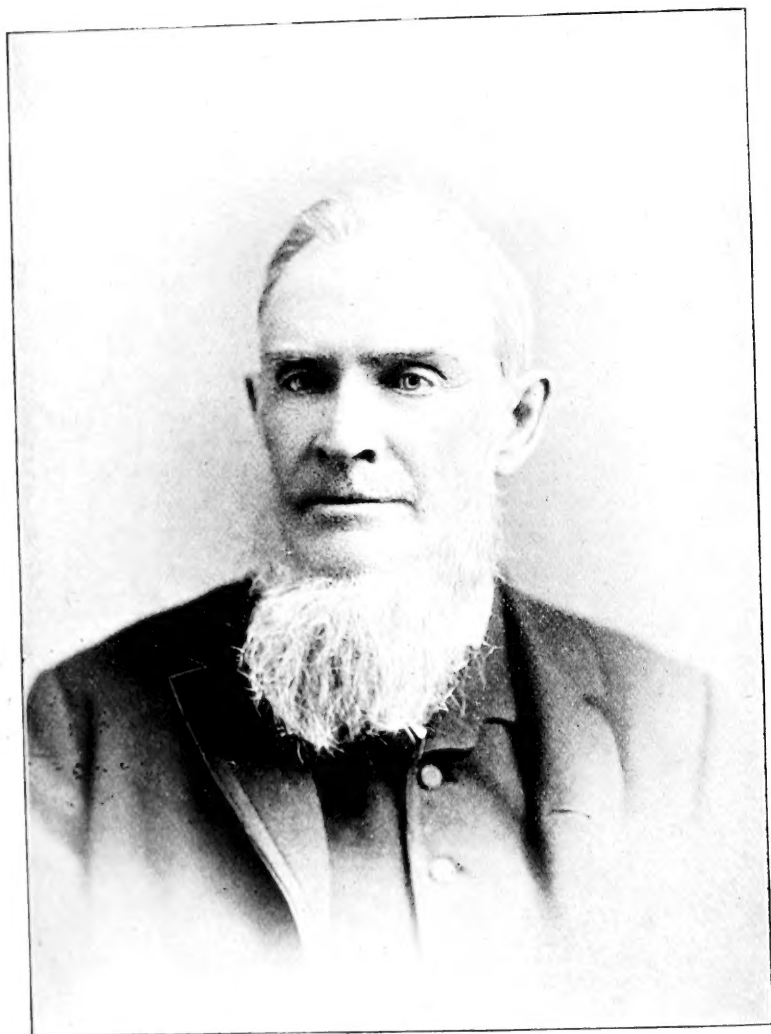


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TRUMAN M. SMITH, SAN DIEGO, CAL.

President of this Society eight years, viz: 1873, '74, '75, '76, '77, '78, '84 and '85.

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ANNUAL REPORT

OF THE

Minnesota State Horticultural Society.

1894.

EMBRACING THE
TRANSACTIONS OF THE SOCIETY FROM JANUARY 13, 1893, TO JANUARY
8, 1895, INCLUDING THE TWELVE NUMBERS OF "THE
MINNESOTA HORTICULTURIST" FOR 1894.

EDITED BY THE SECRETARY,
A. W. LATHAM,
OFFICE AND LIBRARY, 207 KASOTA BLOCK,
MINNEAPOLIS, MINN.

VOL. XXII.



MINNEAPOLIS:
HARRISON & SMITH, STATE PRINTERS

1894.

XM
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v. 22
1894

LETTER OF TRANSMITTAL TO THE GOVERNOR.

OFFICE OF THE SECRETARY OF THE }
MINNESOTA STATE HORTICULTURAL SOCIETY. }

207 KASOTA BLOCK, MINNEAPOLIS, MINN., Jan, 1, 1895.

To the Hon. Knute Nelson, Governor of Minnesota:

SIR:—In compliance with the requirements of the law, I have the honor to submit herewith the report of our society from January 13, 1893, to January 8, 1895.

Respectfully yours,

A. W. LATHAM,
Secretary.

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COMMUNICATION FROM THE SECRETARY.

207 KASOTA BLOCK, }
MINNEAPOLIS, MINN., Jan. 1, 1895. }

Fellow Members of the Minnesota State Horticultural Society:

The present volume is the fourth which it has been my privilege to prepare for you, and I have found the work, with such associates, altogether a pleasant one. This, the twenty-second report of our society, contains the twelve monthly magazines—published this year, for the first time, in place of the usual annual report, under the title of “The Minnesota Horticulturist”—the record of the annual meeting of last winter, a few papers not previously included, a full list of members, and the usual double index, in which the titles of papers and their authors both appear in proper place.

All the documents, treatises, reports, etc., of every description connected with this society which have come into the secretary's office up to date have been included in this volume. Being issued at the close of the year instead of at the beginning, as heretofore, the list of members for 1894 is a complete one and the record for the year is literally full.

Trusting this volume will meet your approval, I remain

Yours fraternally.

A. W. LATHAM,
Secretary.

THE MINNESOTA HORTICULTURIST.

VOL. 22

FEBRUARY, 1894.

NO. 1

SALUTATORY.

DEAR FRIENDS: It will be wise not to expect too much at the outset in this movement to change the form of the publication of the horticultural matter that comes into the hands of the secretary through the ordinary channels of the society. The principal object in making the change is to get this matter into your hands in better season and with more promptness, and for the present that will be the principal thing accomplished.

It is, however, the ultimate intention to improve and embellish the publication in every practicable way and make it the medium of furnishing to the horticulturists of the Northwest all attainable information of value in this direction, and make it indispensable to all lovers or workers in any branch of horticulture.

With this worthy object in view may I ask your indulgence and assistance? Remember it is *your* publication as well, being only the result of a common effort to promote and advance a common cause. Material development is a slow process but a very sure one, and by pushing steadily and together along the lines indicated the results we all desire will be gradually attained.

Yours fraternally,

A. W. LATHAM, *Secretary.*

Office and Library, Room 2, No. 427 Nicollet Ave,
Minneapolis, Minn.

NOTE—Considerable space is taken up in this issue with the lists of officers, &c., for 1894, decreasing materially the space intended to be used for papers and general information.

OFFICERS OF THE MINNESOTA STATE HORTI- CULTURAL SOCIETY FOR 1894.

PRESIDENT.

J. M. UNDERWOOD.....Lake City

VICE-PRESIDENTS.

F. W. KIMBALL, First Congressional District.....	Austin
S. D. RICHARDSON, Second " ".....	Winnebago City
L. E. DAY, Third " ".....	Farmington
R. S. MACKINTOSH, Fourth " ".....	Langdon
J. H. STEVENS, Fifth " ".....	Minneapolis
MRS. JENNIE STAGER, Sixth " ".....	Sauk Rapids
J. O. BARRETT, Seventh " ".....	Brown's Valley

SECRETARY.

A. W. LATHAM, Office address,
Room 2, No. 427 Nicollet Ave., Minneapolis

TREASURER.

DITUS DAY.....Farmington

EXECUTIVE COMMITTEE.

(also president, secretary and treasurer ex-officio.)

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J. S. HARRIS.....	La Crescent
Prof. S. B. GREEN.....	St. Anthony Park
J. P. ANDREWS.....	Faribault
CLARENCE WEDGE.....	Albert Lea

ENTOMOLOGIST.

Prof. OTTO LUGGER.....St. Anthony Park

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E. A. CUZNER, (Assistant), Essex and 27th Ave. S. E.....	Minneapolis

(The assistant has charge of the reports stored at Pillsbury Hall, State University.)

SUPERINTENDENTS OF EXPERIMENT STATIONS.

1894.

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E. H. S. DARTT.....	Owatonna
F. H. FIEDLER.....	Fergus Falls
DEWAIN COOK.....	Windom
CLARENCE WEDGE.....	Albert Lea
CHAS. W. SAMPSON (grapes).....	Excelsior
O. M. LORD (plums and small fruit).....	Minnesota City
C. W. H. HEIDEMAN (plums and small fruit).....	New Ulm
D. E. MYERS.....	St. Cloud
H. M. LYMAN (apples).....	Excelsior
J. S. HARRIS.....	La Crescent
L. R. MOYER.....	Montevideo

COMMITTEES FOR 1894.

GENERAL FRUITS.

FIRST CONGRESSIONAL DISTRICT.

Robt. Buttermore.....	Lake City
J. C. Walker.....	Rose Creek

SECOND CONGRESSIONAL DISTRICT.

O. J. Hurt.....	Island Lake
J. T. Furber.....	Madelia

THIRD CONGRESSIONAL DISTRICT.

P. F. Bradford.....	Empire
C. F. Brown.....	St. Peter

FOURTH CONGRESSIONAL DISTRICT.

W. H. Brimhall.....	St. Paul
R. Knapheide.....	St. Paul

FIFTH CONGRESSIONAL DISTRICT.

Dr. M. M. Frisselle.....	Eureka
J. J. Baston.....	St. Louis Park

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C. L. Goodell.....	Barnum
John Bittman.....	Park Rapids

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J. P. V. Evans.....	Twin Valley
S. Jacobson.....	Tordenskjold

SEEDLING FRUITS.

J. S. Harris.....La Crescent

APPLES.

(Including crabs, hybrids, Russians, etc.)

D. F. Akin.....Farmington
J. S. Parks.....Pleasant Mounds
Barnett Taylor.....Forestville
L. E. Somerville.....Viola
Chas. Luedloff.....Carver

PLUMS AND CHERRIES.

O. M. Lord.....Minnesota City
J. M. Doudna.....Alexandria
C. W. H. Heideman.....New Ulm

GRAPES.

C. W. Sampson.....Eureka
Wm. Wachlin.....Faribault
Mrs. I. Barton.....Excelsior

SMALL FRUITS.

M. Pearce.....Chowen
G. H. Prescott.....Albert Lea
Wm. Danforth.....Red Wing
Thos. Redpath.....Long Lake
Mrs. A. A. Kennedy.....Hutchinson

FRUIT BLOSSOMS.

(Cross-fertilization, etc.)

Prof. S. B. Green.....St. Anthony Park
C. W. H. Heideman.....New Ulm
O. F. Brand.....Faribault

FORESTRY.

J. O. Barrett.....Brown's Valley
Wm. Somerville.....Viola
Rev. O. A. Th. Solem.....Halstad

DECIDUOUS TREES AND SHRUBS.

(Including roses, &c.)

J. P. Andrews.....Faribault
E. H. S. Dartt.....Owatonna
Wyman Elliot.....Minneapolis

EVERGREENS.

G. W. Fuller.....Litchfield
D. T. Wheaton.....Morris

OUT-DOOR HERBACEOUS PLANTS.

(Native and exotic.)

L. R. Moyer	Montevideo
Mrs. M. E. Powell.....	St. Peter
Mrs. L. E. P. Sprague.....	225 8th Ave. S. E., Minneapolis

HOUSE AND GREENHOUSE PLANTS.

Mr. Smith.....	Winona
A. N. Kinsman.....	Austin
Fred. Windmiller.....	Mankato

VEGETABLES.

J. R. Cummins.....	Washburn
C. L. Hill.....	Albert Lea
E. M. Chandler.....	Minneapolis
Wm. Lyons	2924 Clinton Ave., Minneapolis

NOMENCLATURE AND CATALOGUE.

J. S. Harris.....	La Crescent
Prof. S. B. Green.....	St. Anthony Park

COOKING AND PASTRY STORES.

Mrs. F. W. Kimball.....	Austin
Mrs. G. H. Prescott.....	Albert Lea

APICULTURE.

T. Theilmann.....	Theilmanton
J. P. West.....	Hastings

ORNITHOLOGY.

Frank I. Harris.....	La Crescent
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ENTOMOLOGY.

J. S. Harris.....	La Crescent
Prof. S. B. Green.....	St. Anthony Park

LIFE MEMBERSHIP.

J. M. Underwood.....	Lake City
Ditus Day.....	Farmington
A. W. Latham.....	Excelsior

LEGISLATION.

J. S. Harris.....	La Crescent
Col. J. H. Stevens.....	Minneapolis
Wyman Elliot.....	Minneapolis
F. G. Gould.....	Excelsior

PUBLICATION.

Wyman Elliot.....	Minneapolis
Prof. S. B. Green.....	St. Anthony Park
A. W. Latham.....	Minneapolis

FRUIT LIST.

(Adopted at the annual meeting of the Minnesota State Horticultural Society, January 12, 1894.)

APPLES.

Hardest apples for planting in Minnesota: Duchess, Hibernial.

For planting in favorable locations: Wealthy, Longfield.

For general trial: Patten's Greening, Peerless, Okabena, Hotchkiss, Anisim, Charlamoff, Kaump, Arabian.

Crabs and hybrids for general cultivation: Virginia, Martha, Whitney, Transcendent, Early Strawberry, Briar's Sweet, Minnesota, Hyslop.

Crabs and hybrids for trial: Tonka, Dartt's Hybrid, Faribault, Greenwood, Arctic, Gideon's No. 6.

PLUMS.

For general cultivation: Desota, Rollingsstone, Wolf River, Forest Garden, Weaver.

For trial: Rockford, Owatonna, Ocheeda.

GRAPES.

For general cultivation: Concord, Delaware, Moore's Early, Worden, Janesville, Brighton, Cottage.

RASPBERRIES.

For general cultivation: Red—Turner, Cuthbert, Marlboro, Brandywine. Black—Ohio, Souhegan, Nemaha, Gregg, Shaffer.

For trial: Older, Palmer, Kansas.

BLACKBERRIES.

For general cultivation: Ancient Briton, Snyder.

CURRANTS.

For general cultivation: Red Dutch, White Grape, Victoria, Stewart, Long Bunch Holland.

GOOSEBERRIES.

For general cultivation: Houghton, Downing.

STRAWBERRIES.

For general cultivation: Crescent, Warfield, Haverland, Bubach No. 5, Bederwood, Capt. Jack, Parker Earle, Wilson.

Small Fruits.

SMALL FRUITS.

M. W. COOK, ROCHESTER.

Eighteen hundred and ninety-three will long be remembered as an eventful year. All lines of business have suffered: commercial and agricultural, mainly from two causes; commercial from political changes and agricultural from atmospheric influence. The majority of the former not being satisfied with doing well enough, hoped to do better, but like the dog in the fable let go of the reality in grasping for a shadow; results, loss and failure. Moral, let well enough alone. The agriculturists and horticulturists suffered from atmospheric changes over which they had no control. Failures in both lines have been almost world-wide. Let us all learn wisdom from past experience, and thoughtfully take a retrospective view of what we each have done in our line, and try to find a remedy for its defects.

You asked me to report on small fruits. The past season has been rather a discouraging one, and one finds it hard to make good out of evil, consequently my report is in keeping with the results of the year—a partial failure.

Rochester is becoming quite a fruit center, not less than one hundred acres of strawberries, raspberries and blackberries being grown in and about the city; and there is a growing interest in that line here and in the adjacent towns, Oronoco, Douglass, St Charles, Kasson, Pine Island, Pleasant Grove and Chatfield, all within a radius of twenty-five miles. In each place are those growing fruits for the market.

My place is located in the southeastern part of the city, joining on the north the Southern Minnesota Fair grounds. I annually pick from eight to ten acres of strawberries (setting each year from three to five acres exclusively for plants), seven acres of blackberries and ten acres of raspberries. I have the land ready to set in the spring for eight acres of red and black raspberries and ten acres of strawberries, thereby indicating my faith in the business, notwithstanding this year's partial failure.

Strawberries came through the winter in fine shape. Vines never looked better in early spring, and continued to do so up to blossoming time. It rained almost continuously up to that time. Eight acres on low ground were for a time almost completely covered with water. When it stopped raining it stopped for good, except a few showers in fruiting time. Owing to so much rain in the spring and dry, hot weather afterward, the ground became hard and dry, although my own was heavily mulched. Notwithstanding all the

rain and hot weather, the vines looked as well as we could ask. I could not see any difference in the appearance of this eight acre piece and one on higher and more sandy land. All looked well and blossomed as full as possible, and fruit set as full as could be desired. At this time for two days it was 100 to 115° in the shade. From that time on the fruit stood still, the hulls and vines continuing to grow, the little hard, small, seedy fruit turning red, excepting a small portion of the promised fruit which was protected by the heavy foliage. Except this, the crop was a failure, 5,000 boxes being the amount received from ten acres. All varieties suffered about alike, Bederwood standing at the head for productiveness and size. The varieties cultivated were Crescent, Warfield, Pearl, Saunders, Lovett's Early, Edgar Queen, Great Pacific, Woolverton, Princess, Enhance, Parker Earle, Haverland, Capt. Jack, Wilson, Jessie, Crawford, Eureka and Bederwood.

The partial failure of strawberries seems to have extended to all parts of the country, north and south.

Red raspberries, mainly Cuthbert and Turner, gave about one third of a crop. Marlboro on one year bushes gave some very fine specimens and promises well on rich soil. Blackcaps, mainly Ohio, did fairly well, considering the dry weather.

Blackberries seem to have been damaged in the spring by the excessive rain and hot weather which followed, and were not more than one-half a crop. Snyder being an early variety seems to have been damaged more than Stone's Hardy or Ancient Briton. These are the three varieties in cultivation, each good, but the Ancient Briton, being of medium season, stands at the head of the list.

SMALL FRUITS.

E. E. HARRIS, LA CRESCENT.

The past season (1893) was very unfavorable for strawberries in this locality, drouth and insufficient fertilization being generally accepted as causes of failure.

With my experience and observation I would hesitate to recommend a list of varieties, unless I could be sure that I would never meet the man who adopted the recommendation. Let every man choose for himself, and whatever variety he selects he will wish he had taken some other. I would not discourage any one, for I am sure that in spite of frequent failures there is money in it. With regard to soil, I would say, use the best you have; if not rich enough, manure heavily and raise some other crop the year before you set the plants. The only right time to set strawberry plants is in the spring. Set in rows four feet apart and two feet apart in row, with not less than one-third pollenizers. Thorough cultivation is required for success in raising any crop.

Mulching is a fine art which sometimes does a great deal of good and sometimes works the other way. Material for mulching is better if run through a feed cutter. Cleaning up old beds rarely pays; better to set new plants every year, though some old beds do very

well, I think berries from an old patch are a little earlier than from a new. Watering in dry weather is not generally a success. We do not realize the immense quantity of water required to do justice; a little is worse than none.

Raspberries produced an average crop of excellent fruit the past season. I recommend Shaffer's Colossal and Cuthbert for red, and the Ohio and Nemaha blackcaps. New varieties are generally disappointing. I set in rows nine feet apart, and two and a half feet in row. Eight feet is enough for Cuthberts. Do not pinch back the first summer; after first season pinch back new canes when about 15 inches high; I do not think it increases the yield, but canes stand better. I have tried a new way of setting which I think will be a great success. I set blackcap varieties $2\frac{1}{2}$ by $4\frac{1}{2}$ feet, and shall remove every other row immediately after picking first crop, leaving rows nine feet apart. Where plants of choice varieties are scarce every other row could be set to some common variety. I hope others will try this method and report success.

Wires to support canes are a great help, but not necessary to success. They seem to work best for rich men, but poor men can get along without them.

In cutting out old canes of blackcaps always use pruning shears. The pruning hooks used by many are injurious, especially if the ground is very wet. Hooks do not harm blackberries or red raspberries, but I find the shears do a better job.

Shallow cultivation is generally recommended for blackcaps; deep cultivation, if practised from time of setting plants, does not injure, as roots adapt their growth to the method of culture; deep plowing close to old plants that have previously had shallow cultivation is injurious.

Manuring between the rows of an old plantation is an operation that requires some judgment. On my rich soil I find it does not pay; it increases size of canes but does not increase the crop. On poor land it might be beneficial, but I think the better way is to manure heavily one year before plants are set. I do not think that raspberries exhaust the fertility of the soil, as I have noticed that where an old patch is plowed up, the ground produces good crops for several years. Throwing up a good furrow with the plow, both sides of a row, and leaving it rough without further cultivation, produces excellent results on old bushes, which are to be plowed up after fruiting. I cannot recommend that for young bushes to be kept in bearing; the ground should be kept level with a cultivator.

Blackberries were a total failure last year. Unprotected canes killed to the ground, and those who laid down their bushes worked cheap and went without berries. I have discarded all varieties but the Ancient Briton, believing that to be the best for this locality.

Pinch back young canes early—I think most of the big stories about immense profits would stand considerable pinching back, too. Under favorable circumstances they do yield enormously, but the trouble is to get the favorable circumstances.

Currants.—I have had the best success with Prince Albert and Victoria. Bushes set six years ago have never failed to produce

a good crop, after the first year. The demand for currants seems never to be satisfied, yet the price is seldom above two dollars a bushel.

Picking Berries.—I use a home-made picking crate, holding two boxes, made exactly like a 16-quart crate except in size, with a wire handle. Each picker is supplied with one picking crate, one eight quart crate and ten boxes. As soon as a picker has eight boxes full the attendant takes them to a hand cart and returns eight empty boxes. The picker, having two extra boxes in the picking crate, loses no time in changing.

The best endorsement of these picking crates is the opinion of the pickers. I have yet to find the first one who, after using, would pick without a crate. I hire my pickers every morning, and pay cash every evening.

At this date the prospect for small fruits the coming season looks encouraging.

DISCUSSION.

Mr. J. S. Harris: There was one point brought out there, and that is the experiment we made in planting blackcap raspberries twice as thick as we expected them finally to stand. It gives us a full crop the next year after setting. We let them grow the first year and cut them back to two and one-half feet the next spring, and give them a good mulch. We get a full crop the next year.

Mr. O. F. Brand: I wish Mr. Harris would state the variety of currants he has that are most profitable.

Mr. Harris: Red Dutch.

Mr. C. Wedge: I would like to ask Dr. Frisselle what he realizes from currants, and if they are generally profitable.

Dr. M. M. Frisselle: They are in most seasons, but the past year was most unprofitable; we had about one-third of a crop. They are quite as profitable as grapes.

Mr. Wedge: What do you realize from them?

Dr. Frisselle: It figures from \$2 to \$4 a bushel. I sold most of them for \$4.

Mr. Wedge: What varieties do you find the most valuable?

Dr. Frisselle: The Stewart and Long Bunch Holland. I find the Red Dutch are a very unprofitable variety. The Stewart brings in the market a dollar per bushel more than the Red Dutch.

Mr. Wedge: Has any one had any experience with blight on currant bushes?

Mr. Harris: Do not know what it is.

Mr. Wedge: I have a letter here from a gentleman in regard to that blight. I have never heard of it before. He inquired what causes blight. He says he has three kinds of currants,

Red Dutch, Fay and Stewart; the latter were the only kind that did not blight. Usually he has forty to one hundred cases, but this year on account of the blight he had only one case. The leaves of the bushes fall off before the currant ripens and the fruit blisters and becomes whitish instead of red.

Mr.S.D.Richardson: In our county we have something similar. It is caused by the borer. I have seen the fruit turn white, but in every case the knife reveals the borer. The old wood has frequently to be cut out in order to raise a crop.

Dr. Frisselle: I have had some experience with currants, and I notice my Red Dutch shed the leaves very early, and after the leaves have been shed the sun at that time scalds the fruit and it turns white.

Mr.G.W.Fuller: I have had experience somewhat in that line. As long as I raised the Victoria currant they were affected by this so-called blight; they were covered with a white substance like a mould, and I discarded the Victoria. The Red Dutch are never affected in that way.

Mr. Harris: It occurs to me now since the subject comes up, that I have seen that blight. When I was around Lake Minnetonka before our summer meeting I saw some currants that had died back during the winter. It is the same thing that attacks the apple trees; it is the same disease that causes the grape and the apple to fall off prematurely.

Mr. Fuller: The leaves in this case did not fall at all, but the bushes were covered with mildew like the gooseberries.

SMALL FRUITS.

WM. ROBINSON, HASTINGS.

I was somewhat surprised to receive a notice that I was appointed by your society on the committee on small fruits, as I was not a member nor ever had the pleasure of attending any of your meetings.

You say it need not necessarily be a record of my success in small fruit culture, for as often more is taught by failure. If failures will teach anything, then mine ought to be of benefit to myself and, perhaps, others.

I have been but two years trying to cultivate small fruits, and as yet have failed to get but small returns.

I set out in the spring of '92 one acre of raspberries, one-half Turner and Cuthbert, the balance Philadelphia. There were but few failures in growth, and all went well until last spring when, instead of cultivating them, I decided to mulch them, as I had a large

amount of coarse, strawy manure at my command. I had heard and read so much about mulching that I believed it would be just the thing, and had calculated that it did not matter how dry it was, that a good thick mulching would secure them from all suffering from lack of moisture; but how great was my surprise when my fruit began to grow and ripen to find it pinched and small, and that it finally about dried up. The plants that I set out to supply failures made but very feeble growth, while many of them died altogether after making quite a growth; none of them made more than about one foot in growth, while the plants in an acre set right alongside of them, which were thoroughly cultivated all summer, made from two to five feet. I am thoroughly convinced that stirring the ground often is far better than mulching, and especially such land as my strawberries are on—a black sandy loam with gravelly subsoil. If I apply any more manure, I shall use well rotted manure that I can work in with the shovel plow.

I also planted in the spring of '92 an acre of strawberries with eight different kinds. I set them in rows six feet apart. All the kinds, except the Parker Earle, would have covered the ground had I allowed them to do so. They were planted on land sloping to the northeast, the northwest corner running up quite high on the slope. After the ground froze in the fall, I covered them with quite a thick coat of straw, and in the spring raked a very small part of the straw from them and left it between the rows. I think a mulch for strawberries is very nice, not only for a protection for the plants but also to keep the fruit clean and hold the moisture. I think, with plenty of rain, I might have fairly good success with strawberries. Of the different kinds I have tried, I like the Parker Earle very much, but the Bederwood is ahead of any other for this reason: they commence to ripen earlier than any other and hold on longer.

Pres. J. M. Underwood: Any remarks on this paper of Mr. Robinson's in regard to mulching? That seems to be the principal thought.

DISCUSSION.

Mr. C. Wedge: I will say, Mr. President, I never could raise raspberries or any kind of berries on clay soil without mulching; it seems to be a necessity.

Mr. S. D. Richardson: My experience has been the reverse every time, and I cannot carry my fruit through without cultivation; with mulching it would all dry out.

Mr. J. S. Harris: I believe in mulching, but I believe you want to cultivate and mulch, too.

SUGGESTIONS ON SMALL FRUIT CULTURE.

M. W. COOK, ROCHESTER.

There has been so much said and written on small fruit culture that there is little left that is new by way of instruction to add. No one who is inclined to grow fruits, either for himself or for market, need hesitate on account of lack of knowledge of what, how, or when to plant, or how to prepare the soil, etc. Good instructions are to be found in all good horticultural papers, at the farmers' institutes and especially in the annual reports of this society. Why it is that so many tillers of the soil neglect to avail themselves of such knowledge, the putting into practice of which would add so much pleasure, health and profit, is a mystery to me.

All like small fruits, all need them, all can very easily have them fresh from the vines two or three months and canned the rest of the year. You can grow them for two cents per quart, strawberries, red and black raspberries and blackberries. Do you owners of land want such a feast for your families and sick neighbors, the year round? Then arrange to plant the coming spring. Don't wait, but plant any land you have which will grow corn or potatoes. Don't plant strawberries where the chickens will scratch up the vines or eat the fruit. Farmers' chickens all like strawberries, and so do the children. *Don't* get your plants from your neighbor's bed. Don't set all pistillates (females); you would have plenty of vines and bloom, but no fruit. Get your plants from a reliable source, not more than two-thirds pistillates and one-third staminate (males.)

Plant in spring as early as the ground will do to work. Plant in long rows, so as to cultivate with horse. Plant a few rows each year on land planted to corn or potatoes the year before and kept clean. Set plants taken from new beds. If from your own, be sure you set perfect flowering kinds alone or near pistillate varieties, if you plant pistillates. Be sure you are right and then go ahead. Give clean and oft repeated cultivation the first year; here is where the secret lies. *Don't buy high priced novelties.* Let plants form matted rows fifteen to eighteen inches wide. Keep the plants hoed and thinned to about four inches apart, if you want lots of fine fruit.

Mulch the ground in early fall, as soon as it freezes, with coarse litter from the stable, clean straw or marsh hay. All must be free from grass or fowl seed. Early in the spring put the mulch off from the rows, leaving a little on them to keep the fruit clean, and laying the rest between the rows for a mulch, to keep weeds down and ground moist and to make a clean path for the pickers.

After fruiting one year, remove the mulch, narrow down the rows with a small plow to ten inches, hoe out all weeds, cultivate well between the rows and scatter on the rows a coat of fine, well-rotted manure, free from grass and weed seed. In September mulch between the rows with any coarse litter from your barn-yard or with straw to keep the weeds down and the ground mellow, and when the ground freezes cover all with clean straw, just enough to cover the plants; and my word for it, you will have plenty of strawberries for your own family and to give to your sick neighbors, that have

not cost you over two cents per quart. Try it this year. It is said, "They who know their duty and do it not, shall be beaten with many stripes."

Plant red raspberries in the fall or early spring, two feet in the rows and the rows seven feet apart. Treat all suckers as weeds. Don't allow more than four or six canes in each hill. It will pay to mulch the ground between the rows with straw; flax, I think, is best to keep weeds and suckers down. Don't allow mulch too near the hills; keep well hoed for six inches around the hills; pinch off the growth when twelve to eighteen inches high and not again until early the next spring and then cut back to three or four feet.

Blackcap raspberries plant in spring two and one-half feet in the rows and the rows eight feet apart. Don't cover too deep; pinch back the first year when twelve inches high, the second year when two feet.

Blackberries can be set in the fall or spring. Set them two and one-half feet in rows and rows eight feet apart; pinch when twelve to eighteen inches high.

All raspberries and blackberries need winter protection. This is easily and quickly done. Remove the dirt from the side of the hill four inches deep, gather the branches with your arms and pull them over while a second man at the same time plants his foot firmly on the base of the hill and presses hard, slowly bending the bush in the root until nearly flat on the ground, and holding it there until dirt is put on the top sufficient to hold it down. The top of the next hill should rest near the roots of the first. The art of laying down will be easily acquired by practice. In early spring, with a fork remove the dirt carefully and lift up the bushes.

I will here suggest some good varieties to plant. For strawberries, Crescent and Warfield are among the most prolific when well fertilized. Bederwood stands at the head of all, a perfect flowering kind, very prolific and large and fine, for near markets the best variety known.

For red raspberries, Turner and Cuthbert, and for blackcaps, Ohio, are good enough. For blackberries, Snyder, Stone's Hardy and Ancient Briton are all good.

DISCUSSION.

Mr. P. M. Perry: I will just say a word in regard to the cultivation of strawberries. I will suggest to these old fruit growers that if they will plant their strawberries in check rows, the rows four feet apart and the plants eighteen inches in the row, then cultivate both ways, they will save a good deal of work with the hoe.

Mr. J. A. Sampson: I have tried to find out how to handle strawberries to the best advantage, and my experience has been instead of planting the rows four feet apart, as I have been accustomed to do, that five feet apart is none too far in order to cultivate for the second year's crop. Where we put them four feet apart and have the rows matted, there is not

sufficient room for tillage or for putting mulch on the strawberries; also, if you have a wider space it will hold more moisture. I think that five feet is none to near.

President Underwood: How wide a matted row would you have?

Mr. Sampson: I should estimate about eighteen inches.

Mr. C. Wedge: Do you keep the matted row eighteen inches wide?

Mr. Sampson: That depends somewhat upon the variety. The Crescents will cross from one row to the other. When one wants to cultivate right through regardless of plants, I think the solid bed is not as profitable as one with a space between the rows cultivated and mulched.

Mr. C. W. Sampson: Can strawberries be fertilized five feet apart?

Mr. J. A. Sampson: I am not authority on that subject, but I understand that strawberries can be fertilized, according to the best of my knowledge, as far as ten feet apart, if not further.

President Underwood: How long would you retain a bed of strawberries?

Mr. J. A. Sampson: In my experience I find two years in one place is the better way, but I sometimes hold over three; but two pickings are all that I rely on. I never calculate to set out plants except those taken from a new set bed; I do not believe in taking plants from an old bed.

Mrs. A. A. Kennedy: Prof. Green, what kind of strawberries are the most fruitful, those with a long stem or short stem?

Prof. S. B. Green: I think as a rule that the varieties that are the most fruitful are those with a short stem.

Mrs. Kennedy: If the wind blows hard does it blow the pollen away?

Prof. Green: I do not know that this is the case. There is this much in regard to pollenization, in seasons when we have heavy rains when the pollen is shed by the anthers, it is very likely to be washed away. I think strawberries are largely fertilized by insects; I believe more so than ever since I have experimented with them. I believe as a rule we get a better crop of strawberries if we plant every second row rather than oblige the pollen to travel such a long distance. I think experience in various places has shown that five feet apart would be too far apart to put the rows. I have known a case, however, where one row of May King fertilized seven rows of Crescents, but that was a special season.

Mrs. Kennedy: Would it be better to put the fertilizer right in the row?

Prof. Green: Every third plant right in the row.

Mr. J. A. Sampson. Do you object to five feet apart regardless of the question of pollenization?

Prof. Green: I think that is a very good idea.

Dr. Frisselle: I have experienced the best results in planting one row of pistillates and one row of staminate.

Pres. Underwood: I think these are very important points to bring out, the best ways of pollenizing.

Mr. O. F. Brand: Outside rows of strawberries are not like the boys outside rows of corn. The corn was so poor that year, that he said he would have no more outside rows after that. I find that outside plants of strawberries do the best. One of the Wisconsin growers stated last winter that his plan was to plant three feet apart and then let them run. He kept his runners cut with a cultivator so as to leave his rows about eighteen inches wide, and he thought he got a great deal more fruit on the same ground than by planting his rows further apart.

Mr. G. W. Fuller: Speaking about Wisconsin growers, a year ago I saw a statement that Mr. — had grown not less than seventeen hundred bushels on five acres of ground. I wrote him I wanted to come down to see how he grew them. He set his rows four feet apart; he set six rows of Crescents and two rows of pollenizers; his plants run to make a row from eighteen to twenty-four inches wide. He told me it was true he had picked seventeen hundred bushels, and not less than one hundred bushels rotted on the ground.

Mr. Harris: I think Prof. Hansen might give us some light on pollenizing strawberries.

Prof. N. E. Hansen: We are not doing much with small fruit at Ames, only in the way of breeding and developing new kinds. Last year we took the Parker Earle and the Bederwood and we tried the pollen of one on the stigma of the other, and we hope to get some good seedlings out of it. It is too early to say yet what will be done.

Mr. D. V. Plants: Some eight years ago I noticed this in strawberries by fertilizing with different kinds. I first noticed it with the James Vick and Crescent, and in picking the first rows of the Crescent and Vick we could not tell which was which. I have noticed that the Bubach fertilized with Captain Jack is a great deal larger and better berry than with any

other fertilizer I have seen. Take the Louise and fertilize with and it is a very nice-smooth berry. It does not look like the same fruit as that fertilized with Captain Jack, and I have noticed that there is the same, but not such a marked difference as there is between the Vick and Crescent, and Captain Jack and Bubach.

NEW STRAWBERRIES AND SOME NOT SO NEW.

G. J. KELLOGG, JANESVILLE, WIS.

I regret that state institute work prevents my meeting with you at the grandest review of the year.

In testing new strawberries it is impossible to prove any variety in less than three to five years on your own ground. I shall only attempt to briefly mention a part of those that have been before the public for the past few years, with a few others on trial.

Accomac, large, early, often a failure.

Allen No. 1, (p) medium size and every way worthy of general trial.

Anna Forest, large, early, not a success in 1893.

Aroma, grand and good, firm enough to ship.

Beverly, one of the prize varieties, promising if petted.

Bessie, (p) small, its productiveness its greatest fault.

Beebe, large, irregular, showy, vigorous.

Belle, large, very late, good and productive.

Boynton, seems identical with Crescent.

Cameronian, probably the largest show berry yet produced unproductive.

Cruse's No. 9, late, vigorous, productive.

Crawford, perfect every way, yet lacking productiveness.

Clingto, small, productive.

Cyclone, early, productive, one of the best.

Clyde and Cycloma, the same; firm, productive, promising for market.

Cleveland, Mrs., (p) productive, off color, soft and only valuable for home use and near market.

Clark, same as Idaho.

Dayton, large, needs careful treatment, unproductive in matted rows in some places; on some soils wonderfully satisfactory.

Dew, very large, of Sharpless type, needs special treatment.

Edith, one of the largest size and worthy of trial.

Equinox, claims to be the very latest and most productive.

Earle, late, enormously productive and needs a heavy manure mulch.

Ed. Queen, (p) the best of 5,000 seedlings, is of the Bubach type, late and worthy of general planting.

Enhance, very productive, late, vigorous, firm and one of the best for pollen; its great objection is that some seasons it is rough and rigid; but is making its way to the front

Eureka, (p) late, productive; some seasons out of shape, yet it pays for home use and near market.

Fitch No. 2, early, productive, medium to large, best for home use and near market.

Gillespie, needs petting, but every one should try it.

Greenville, (p) is one of the most promising new sorts, large, firm and as productive as Crescent.

Hoard, a twin brother of Jessie and is making a good record in many places, blossoms late and promising, but sometimes the blossoms blight.

Ivanhoe, good shipper and every way desirable and should be in every collection.

Idaho, of the Bubach type but not productive.

Katie, (p) very promising, productive and extra quality.

Leroy, (p) everything No. 1, except firmness and yet it is a fairly good shipper.

Lincoln, is Crescent again.

Leader, large and like many large berries not very productive, good in many places.

Lovett, not very early, but a good pollen variety for early and mid season; productive and profitable.

Lydia, worthy of trial.

Muskingum, handsome, large, productive and will become a leading market variety.

Martha, (p) this is a leading market sort where known and is profitable on most soils.

Marshall, claims to be the largest and should be tried by all amateurs.

Middlefield, (p) has conflicting reports; it is a success with us; try it. Michel, is good and good for nothing, the only recommendation we give it is to grow plants to give away.

Mary, claims to excel all others in size, beauty, firmness, quality and productiveness.

Omega, (p) very late, productive and vigorous.

Oregon, said to be productive in dry climates, but is worthless in the main strawberry belt.

Princeton Chief, promises to be "the best shipping berry ever introduced," worthy extensive trial.

Putnam, (p) large, not very productive, but with good care and treatment will pay.

Pacific, very vigorous and, if plants not allowed to mat, fairly productive; a firm, large berry.

Phillips, productive and worthy of general trial.

Photo, (p) good for home use and near market.

Quick, is new and very promising as a late productive sort.

Regina, late, but too small for profit.

Roe, E. P., very late, testimony very conflicting, proving a success and failure, needs extra care.

Rio, early, handsome, with good shipping qualities; this has been tried over a wide range and will, we think, prove satisfactory.

Shaw, is Sharpless again.

Smith's Seedling, origin uncertain, comes nearer to the Wilson in its glory than anything we know of, worthy of trial.

Stayman's No. 3, vigorous, productive, medium, tart.

Shuckless, a novelty which will be prized by amateurs.

Sadie,(p) wonderfully productive, rather small unless kept in hills

Swindle, (p) true to name in some places, in others very satisfactory; "50 bushels per acre at one picking" is its record; late and worthy of trial.

Shuster's Gem, (p) of Cumberland type, productive and worthy of trial for home use and near market.

Southard, is uncertain; with good soil and treatment a success; early, very satisfactory in some places.

Splendid, on our own grounds in 1893 beat the Bubach in productiveness and is every way desirable.

Saunders, is very satisfactory over a wide range, large, productive, firm and excellent for pollen.

Tennessee Prolific, large, productive as the Haverland, perfect blossom, vigorous and profitable for home use and near market.

Timbrell, (p) is trying to get to the head of the list, is certainly blowing a big horn and should be tested by everybody.

Van Deman, unproductive in 1893 with us.

Victor, very large, very early and desirable.

Wonder, it is a wonder how it ever got out; same as Oregon and if good anywhere it is in a dry climate.

Westbrook, (p) extra quality, too small to win.

Woolverton, one of the best for pollen and productiveness.

Weslon, (p) large, productive, firm, late, excellent quality and good shipper, one of the best out of eighty new sorts on trial.

Yankee Doodle, (p) firm, medium size, good quality, productive, promising as a market sort, one of the best of eighty new ones on trial at the Michigan Experiment Station.

I have omitted many that are proving successful in many places. Of the sixty-nine I have mentioned perhaps the most promising are Allen, Belle, Earle, Enhance, Greenville, Ivanhoe, Muskingum, Martha, Mary, Princeton, Rio, Smith's, Splendid, Saunders, Tennessee, Timbrell, Woolverton, Weslon and Yankee.

Of the older ones, we do not want to drop Bubach, Crescent, Haverland, Jessie or Warfield.

Try all kinds and hold fast to those that are good.

PROFITS OF SMALL FRUIT CULTURE.

C. W. SAMPSON, EUREKA, (Lake Minnetonka.)

The profits of small fruit culture are many and varied. I do not mean by profits so many dollars and cents by any means, as there are many other things that go to make up the profits of small fruit growers. In the first place what would our home in the country or in the village be without the luscious fruit that we gather from our vines and bushes from time to time? We first begin with the strawberry about June 10, and we bring in every day the beautiful berries fresh from the vines; these generally last until about July 1, when

the raspberry takes its place, and we have that most delicious of all berries with us through July; that is followed by the blackberry, and last, but not least, the luscious grape.

Now, then, what is to hinder any man or woman who has one-quarter acre of ground from raising all the splendid berries that a moderate-sized family can use? If farmers fully appreciated the advantages of a fruit garden, few would be without one; they could get from it more health, more comfort and more dollars for the same amount of labor, than from any other part of the farm. Let each child and the wife have the care of some particular row or bush or plant, and they will soon learn to love the old homestead, and it will help to keep the boys on the farm.

Now we will, if you please, just lay out a small fruit garden for the farm or the village lot. We will take just one-quarter of an acre, four rods wide and ten rods long, for convenience in cultivating. We will manure the ground thoroughly, plough deep and pulverize until perfectly mellow. Place the first row three feet from the outside and set to Transcendent apples and Desota plums; second row, 50 blackberries, 25 Ancient Briton, 25 Snyder; third row, 50 raspberries, black, 25 Ohio, 25 Gregg; fourth row, 50 red raspberries, 25 Turner, 25 Cuthbert; fifth row, 50 currants, 25 Victoria, 25 Fay's Prolific; sixth row, 50 currants and gooseberries, 25 White Grape currants, 15 Downing and 10 Houghton gooseberries; seventh, eighth and ninth rows, 300 strawberries, Warfield, Jessie, Wilson and Parker Earle; Tenth row, 18 grapes, 6 Moore's Early, 6 Delaware, 6 Concord. Have the rows seven feet apart, except the strawberries, which should be three and one-half feet, and you ought to gather 30 bushels of fine fruit every year. You must bear in mind that the soil should be rich, thoroughly cultivated and well drained.

Frequent cultivation keeps the ground moist and mellow. In setting, the roots should be well spread and the earth packed firm about them. No fruit should be allowed to grow the first season. Weeds must not be allowed to grow among small fruit.

Blackberries and raspberries should be pinched back when 18 inches high; severe pruning increases the size of the fruit. Old canes should be cut and burned as soon as done bearing. Mulching holds moisture and prevents weeds from growing. Good plants and pure are necessary to produce good fruit. Winter protection is necessary for small fruits and grapes in Minnesota. Plants should be purchased only of responsible dealers. New, high-priced plants are generally disappointing. Fresh earth is the cheapest covering for small fruits.

Now, from what experience I have had in small fruits on Lake Minnetonka, I think I can truthfully say that I would rather have fifteen acres of small fruits in good bearing than 160 acres of the best land in the state of Minnesota for general farming, and I think I could show as good a profit at the end of the year.

The strawberry grows in nearly every climate and on all kinds of soils, but the best results can be obtained only by good cultivation and high fertilizing. The ground should be well manured with barnyard manure, well ploughed in, and top-dressed with rotted manure; thorough preparation is very essential. Make your rows $3\frac{1}{2}$ feet apart and set plants two

feet in the row; use a line to make the rows straight and a spade for making holes. The roots should be spread out fan shape and not set too deep; 5,000 plants will set one acre. An acre of good strawberries should yield 100 to 125 bushels and ought to bring at least \$300. The fact seems to be that profits depend almost entirely on the method of cultivation, the most profit coming only by the most thorough cultivation and care in gathering and marketing.

Blackberries are very profitable when raised successfully. I have known of 2,000 bushels being raised from 10 acres, selling for \$5,500.

Raspberries, both red and black, should yield from 75 to 100 bushels per acre and sell from \$300 to \$400 per acre, although I have seen a larger yield than this. I have never yet produced a large yield of currants and gooseberries, usually having only a small acreage and variation in prices. In good seasons the yield considerably exceeds any of the other berries, although prices are much lower. I like to be cautious in giving large yields, so few realize the work necessary to produce best results. They are apt to be deceived and disappointed in results.

The fruit grower of today must be well posted, grow only the best varieties, and ship only perfect fruit, use plenty of fertilizers and the best of cultivation. In growing small fruits, I make no iron-clad rule to govern all minor details. The selection of a location, the quality of the soil, the varieties to grow, the manner of planting, trimming and many other things must be determined by circumstances and your own good judgment.

In close connection with this subject let me say, the greatest need of Minnesota farmers and horticulturists today is organization. We need a good horticultural society in every town, and representatives to our state meetings from every locality. We want hundreds of members where we now have tens. We want acres of small fruits where we now have rods. We are paying thousands of dollars to other states every season for fruit that should be grown here, and the great Northwest is clamoring for berries we cannot supply. Therefore, I say, organize at once. Subscribe liberally for good papers; it will benefit you intellectually. Plant a small fruit garden: it will aid you financially, and add comfort to your family and friends.

DISCUSSION.

Pres. Underwood: Thank you, Mr. Sampson. It was a very interesting paper. This is the conclusion of our program and it gives us now about thirty minutes for discussion, in bringing out any thought along the line of small fruit culture that is desirable. Let every one feel perfectly free to ask questions and give their experience and thus add to the information that doubtless some will glean in regard to these things. This will go into our reports and make valuable reading for those who have them to read.

Mr. J. S. Harris: I would like to enquire of Mr. Sampson if he thinks it would make any difference whether the rows in that fruit garden ran east and west or north and south?

Mr. C. W. Sampson: I do not know that I can see much difference in my experience, only that I would prefer to have them run north and south; in that way they get the sun in the forenoon and in the afternoon; in that way I have had a little better success.

Mr. Harris: Now, I disagree with you there, I would rather have the rows run east and west. The sun rises in the north and it is the early sun that we want.

Dr. M. M. Frisselle: I do not know how it is where Mr. Harris lives, but it seems to me at Lake Minnetonka that the sun does not rise in the north. (Laughter.)

Mr. E. H. S. Dartt: What do you think the average yield is year after year?

Mr. Sampson: I should say not over one hundred bushels to the acre.

Mr. Dartt: Would it come up to that?

Mr. Sampson: We have had some very poor strawberry years the last few years.

Mr. Dartt: Have poor years been the rule?

Mr. Sampson, I think the last four or five have.

Pres. Underwood: What has been the cause, drought?

Mr. Sampson: Last year drought was the cause of our failure.

Pres. Underwood: Is there any way to overcome that obstacle?

Mr. Sampson: Mulching tends to prevent it.

Dr. Frisselle: I notice Mr. Sampson recommends that the farmer among other things should plant a few grapes, and he recommends the Delaware, Moore's Early and Concord. I would like to ask him what he thinks of the Brighton in place of the Concord or added to it.

Mr. Sampson: From what I have heard from the Brighton, I should think it would be very profitable to raise.

Mr. Taylor: I would like to ask Mr. Sampson what proportion of strawberries he has raised of different kinds.

Mr. Sampson: I have had the best success with Warfield fertilized with Parker Earle. We have a rich, black sandy loam, and with us the Wilson also thrives exceedingly well.

Prof. S. B. Green: I want to make a criticism on part of Mr. Kellogg's paper. Mr. Kellogg takes exceptional pains to say that the only thing the Michel's Early is good for is to give away plants. Now, if I mistake not about three years ago Mr. Kellogg recommended Michel's Early very highly. I may

possibly be mistaken. Now, the point that I want to make from that is just this, that one season's experience is not enough with one variety, and it is well to go slow with new varieties. I make that point, especially, because some are starting in on strawberries and a long list of strawberries is apt to be misleading.

Now, in regard to grapes, I would not recommend the Delaware or the Concord. I think the planting of the Concord by the farmers of this state has nearly discouraged grape growing. In a great many places the situations are not favorable, they do not receive the proper care and the Concord does not get ripe. In many places they complain that it is sour; they do not know enough to let it get ripe. Of course, it is all right near lakes or in favorable situations. I should rather plant the Cottage, perhaps, than any other kind. Another grape that I think highly of is the Amina.

Pres. Underwood: How is the old Janesville?

Prof. Green: One of the best grapes the farmer can plant, but I think the Cottage and the Amina are the best varieties.

Pres. Underwood: I would like to say in connection with the planting of grapes that our tastes differ very much. Some farmers came to my place one day when we had different varieties of grapes just about ripe. I took them through the vines and gave them all the grapes they wanted to eat, and to my surprise they did not make any comment one way or another until we came to the Janesville, when they declared that was the only grape they had tasted that was good. (Laughter.) This simply indicates that our tastes differ; I thought the Brighton was the only grape fit to eat and they thought the Janesville. I do not care about these different varieties except for experiment. What we want to know is what to plant with three or four varieties, and I think Prof. Green or any one else that has simmered down his experience so they can undertake to answer that question can tell us what two varieties of pistillates and what two kinds of staminate they prefer to all others to recommend for general planting to those who want strawberries for their own tables, or to the market gardener who wants to raise strawberries to sell.

Mrs. A. A. Kennedy: I wonder Mr. Kellogg speaks about the Michel's Early as he does. I wrote to Mr. Thayer that I wanted to set out a bed of Crescents and to send me a fertilizer for that kind of berry, and he sent me Michel's Early; I planted a large bed of them, and it seems to me he ought to be good authority.

Mr. Harris: At the time Mr. Kellogg spoke so highly of the Michel's Early it had not fruited with him. I remember he saw the fruit at an exposition a few days afterwards, and he said to me: "If this is the Michel's Early I am sorry I spent so much money and planted so much of it." I have never heard him speak of Michel's Early since. I know Mr. Thayer considers the Michel's Early a good pollenizer. We have used it on our own place pretty extensively; the first picking it is a nice market berry.

Pres. Underwood: I think if Mr. Kellogg was carrying out his idea when he said the Michel's Early was only good to give away, perhaps he gave them to Mrs. Kennedy.

Mrs. Kennedy: No, sir. He did not. (Laughter.)

Prof. Green: Michel's Early is one of the best berries for a fertilizer that I know of; it is not a nice looking berry, the dealers do not like it, but it is as nice in quality as one would want. I have used it quite a good deal as a pollenizer and I think well of it. Yet, if I grew berries for market and could get the Bederwood, I should plant that variety. I think Bederwood is the most promising today for general use. The Wilson in some localities does finely; where it does well, I think it is desirable to use. A great many are not successful with it, but I do not think that the time has come yet to discard Captain Jack. The four or five varieties that I would recommend for setting out are, say, one-third Crescent, one-third Warfield and one-third Haverland, and fertilize with Bederwood and Captain Jack.

Prof. N.E.Hansen: There was some talk about the Bederwood in Iowa. The general opinion is if we plant only one kind plant the Bederwood. It bears well and is a splendid fertilizer for the varieties that have been tested. As to the best pistillate varieties there is some difference of opinion; the Warfield is highly spoken of, but a large number of our fruit men believe the Warfield and the Bederwood are the best combination we have today. The Parker Earle is highly spoken of by a number of our horticultural men, but in one or two places it does not seem to do much, though on all sides it is spoken of as a splendid berry; its late season is generally an advantage; the Bederwood is early. Michel's Early we do not think much of; in fact, we say very little about it, and those who have tested it seem to be willing to say but little about it.

There was some talk about the Cottage grape. The Cottage grape is excellent some years; it comes in between the Worden

and Moore's Early, but is not good to grow for market use; for market it shells too much. It is excellent in quality and perfectly hardy. The Moore's Early is getting more and more in favor in our state. The only objection against the Moore's Early is that it does not seem to bear as well as the Worden and Concord. If we prune it longer than the others it will do well; with the best treatment, however, it will not bear more than two-thirds as much as the Worden. The Moore's Early should be trimmed longer, with longer spurs on, as the first two or three buds are too weak, so if you will leave the spurs longer it will bear better. The Moore's Early is an excellent shipper. Now, that is the fault of the Worden, it shells a little too much to be the best shipper; still it is at the head of the list for all purposes, for near market or home use.

The Janesville we call the lazy man's variety; it will bear without any winter covering and is regarded as excellent in northern Iowa.

Mr. Harris: I would like to ask Prof. Green why the Early Victor would not be a good grape for the farmer?

Prof. Green: I think well of it, but it does not produce as much as Cottage; it is a trifle later. I should rather put in the Worden, The Early Victor is not as good a grape as the Cottage, but it hangs on better. A variety I think pretty well of is the old Hartford; it is very productive in almost any soil or situation.

Mr. Latham: What do you say about the Telegraph?

Prof. Green: That is a good one, but there is no use recommending a long list. We want those grapes that are hardy and easy to grow.

Mr. Latham: Do not all these remarks that you made about the Cottage apply to the Telegraph? The Cottage has one fault, it is apt to mildew in the blossom; I have discarded the Cottage. The Telegraph is not a first quality grape, but it can be raised easily and most people like it. It ripens early and bears a handsome bunch; it does not shell from the bunch and I know of no particular fault with it, only that it is not very good.

Mr. Wedge: One fault with the Telegraph is that I could not get it to ripen its wood. The grape would ripen, but it is the worst kind I have ever tried to get the wood to ripen. It killed back every year.

Mr. Harris: Mr. Brand knows of a grape below Faribault that is very early and very hardy; it is a seedling; it is one of the earliest grapes and very productive.

Mr. Richardson: Who is the originator?

Mr. Brand: Mr. Wolcott.

Mr. Harris: The grape was shown and took a premium at the state fair. I have seen the vines in bearing and I know it is a good grape to raise.

Mr. Elliot: There is one point we have not touched upon in the cultivation of strawberries. What kind of fertilizers we should use, whether we can use a commercial fertilizer or those of our own home production to the best advantage?

President Underwood: That is what we want to bring out, the best fertilizer and mulch. We have a few moments we can give to this thought.

Mrs. Kennedy: Is there any better fertilizer for strawberries than wood ashes?

President Underwood: Can Prof. Hansen or Prof. Green give us any information on that point?

Prof. Green: In some localities ashes give quite wonderful results. I used to think before I came west I knew all about fertilizers, but since I came to Minnesota I have concluded I do not know anything about them. I get the most peculiar results. In the east I used to get uniform results by the application of potash. Sometimes we get no results here at all. The best results at the experiment station have followed the application of manure, salt and gypsum; occasionally we have used a small amount of nitrate of soda. It is a rather peculiar matter, and we are all at sea about the use of fertilizers on the land. The use of ashes with salt are very satisfactory. In some sections of the country, they get absolutely no results from the use of ashes. The only way is to try it yourself; that is the only way I know of.

President Underwood: A very good way I think to prepare for strawberries is not to depend upon keeping a bed too long. In fact, those who are giving their entire attention to growing strawberries for market I think obtain the best results by taking a piece of land and using any kind of fertilizer, either green clover or a liberal supply of barn-yard manure: by having the ground in thorough condition and planting a new bed every year, they hardly fail to get a good growth. If you have good varieties like the Crescent and Bederwood, you are very sure to have good results. In fact, in reading and experimenting in regard to fertilizers, as nearly as I can find out the best results are obtained from liberal use of barnyard manures.

Mr. Elliot: In the east we hear a great deal about the use of commercial fertilizers, but here in the west where we are in a new country, with new land and with such an abundance of farmyard production that can be utilized, it seems to me the time has not come when we can use commercial fertilizers to the best advantage. I think if every one would use the home production and apply it judiciously they would arrive at the conclusion that it is the most economical fertilizer they can use.

THE STRAWBERRY

D. V. PLANTS, LONG LAKE.

To grow this fruit the land should be rich and well drained, moist but not wet, and pulverized deeply. Then roll or crush, I prefer the latter, as it levels the surface much better than the roller. I then take my line and put a six-penny wire nail through the line every twenty-six inches until I reach the end of the line. Then I start at a certain point, stretch the line, set a plant at each nail, then move my line three feet and nine inches, keeping my point of beginning in view, until the plantation is set. It is then checked rowed twenty-six inches by three feet and nine inches.

I cultivate both ways and as often as once a week and sometimes more often. After a shower, as soon as the surface is dry enough, to close the cracks caused by drying, so as to retain the moisture for plant growth, I keep the cultivator running both ways until the first of August, keeping the runners cut off until that time; then cultivate the wide way only until October first. At the approach of cold weather, mulch *very heavily between* the rows, and *on* the rows *very lightly*. Even in planting large fields I would use a line, for much is to be gained in cultivating by having straight rows. Great care must be taken in digging plants so as not to injure them, for much depends on this. Plants should be raised outside of the fruiting plantation, and should be dug up solid for setting; we get much better and stronger plants by doing this than we do by digging from the alleys of fruiting beds.

What particular varieties will succeed best with any one is hard to tell. *Every* fruit grower must experiment to some extent himself.

Another very important point is good drainage. This is done best by ditching, as it changes the physical character of the soil, the circulation of air and the readiness of water to move through it. This in some mysterious way changes the character of the soil and greatly promotes plant growth, even though no fertilizer is applied, and the results are more satisfactory.

To classify the strawberry growers of this country I would put them in three classes, as follows:

First.—Those who have other farm work to do besides raising berries. They go at it in a wholesale, broadcast, slip-shod and destructive way. They get a very unsalable variety of berries and no profit.

Second.—Those who are rather careless and neglect their farm work to attend to their berry patch, and neglect their berry patch to attend to their farm work; hence they raise quantity at the expense of quality, and *they* too, come out on the wrong side of the ledger.

Third.—Those who follow this plan: that in order to grow for profit we should aim to grow the very best—for the best is none too good for the labor and expense in growing it. There is little or no profit in small and inferior fruits of any kind. The markets seem to demand larger and brighter colored fruits each year, hence we should plant only the very best of a few varieties; a much more uniform grade can be offered.

The best time to plant is in the spring, as soon as the ground will do to work. Good plants as much as any one thing effects the quick start and vigorous growth of the strawberry crop.

The strawberry crop was almost a failure in this part of the country the past season. We were troubled more than usual by berries not developing. They seemed to draw together at the end and were knotty and small. I think this was *not* the lack of pollen, for the perfect flowering varieties were as bad as the pistillates. I think this was caused by the hot, dry, southern wind, which cooks the pollen when in full bloom.

The stride that the horticulturists are making will soon bring them far on the road to success.

STRAWBERRIES.

CAN A FARMER RAISE THEM?

GEO. H. PRESCOTT, ALBERT LEA.

(Read at the annual meeting of the Southern Minnesota Horticultural Society.)

The Minnesota farmer can raise almost anything, even a mortgage, if he really sets about it.

First, it is necessary to have good plants. A good plant should be large, with plenty of roots, and be not over one year old. Next, the land should be in proper condition. The best preparation I have found for strawberries is a piece of corn land that was kept very clean the year before. Do not plow that land again before you set the plants. It will throw up the weed seeds turned under the year before and bother you the whole summer.

What kinds shall the farmer plant? Some staminate kind, Wilson, if his land is heavy or clay subsoil, Glendale, if light or gravel subsoil. The Wilson on sandy soil does not grow high enough to keep the fruit out of the sand, while the Glendale will grow tall and be better than on heavy land.

When to plant. As soon as the frost is out of the ground, set your plants. Strawberry plants will grow in cooler weather than some other plants and need plenty of moisture. Early plantings get the early rains, in fact, all that comes. To set the plants take a garden fork and commence between two rows of corn stubble. Insert the fork at an angle of forty-five degrees. Push the fork from you enough so that another person can put the roots of

the plant deep enough, and hold the plant until the fork is removed, when the soil will fall back on the roots; step by the side of the plant to firm the soil around it. Insert the fork one step from the last plant, and so on to the end of the row. That will leave your plants in rows as your corn was.

How to cultivate. Start the cultivator as soon as the plants are all set; go just as near as you can to the row and not cover up the plants, and continue once a week until frost, going close to the plants every time. Hoe when needed.

When the ground is frozen hard enough to hold up a loaded wagon, cover with wheat straw thick enough so you can once in a while see a strawberry leaf sticking up through. As soon as the frost is out in the spring, rake the straw off the plants in between the rows, but be sure to leave enough straw on the plants to keep the fruit clean. Have part of the bed covered for ten days or more, for the first ones uncovered will blossom and may be killed by frost, while the others ten days after may miss it, and they will be a little later and may prolong the season.

Set out a new bed every spring.

RASPBERRIES.

J. S. HARRIS, LA CRESCENT.

[Read at the annual meeting of the Southern Minnesota Horticultural Society.]

The strawberry may be the most popular fruit, but the raspberry is second to it only in value. The raspberry has perennial roots producing biennial woody stems that reach a height of three to seven feet, varieties differing greatly in the height to which they grow. Usually the canes or stems do not bear fruit until the second year, and that season ends their life, their place being taken by a new growth from the root. It is valuable as a dessert fruit, very wholesome, and its agreeable subacid flavor pleasing to most tastes, scarcely less so than the strawberry, and it is even more sought after for making preserves, jams and jellies, and at the present time the fruit is used extensively by confectioners for making syrups and in families for shrub, wines and vinegar to produce refreshing summer drinks. Succeeding the strawberry at the beginning of the summer, when there is comparatively little other fruit, it becomes one of the most invaluable. It is so easily grown that it should have a place in every garden, in village and on farm.

The best soil for raspberries is a rich, deep, sandy loam, rather moist than dry. If not naturally rich, it should be made so by the use of manures, but need scarcely be made as rich as for strawberries. The manure from neat cattle and hogs is preferable, because cooler, more lasting and a better returner of moisture. The ground should be prepared by deep plowing or digging and thorough pulverizing. We like an open, sunny place for growing them, but they are more accommodating to circumstances than some other fruits and will do very well when partly shaded on the north or east side of a fence or even between the rows of trees in the orchard, if they are

not too close to permit intervals of open sky and sunshine. The varieties most commonly grown at the present time and that are proving the best adapted to this region and climate, are of two distinct species, the *Rubus Strigosus*, to which belong the red-fruited, and *Rubus Occidentalis*, or the black family. The best varieties of each will be noted later on.

There is a very marked difference in the habits of growth and methods of propagating the two species. The red varieties usually throw up suckers from the roots in sufficient abundance for all practical purposes, and these young canes taken from between the hills and rows are usually the plants of commerce and the means used for extending our plantations.

The blackcap varieties are increased or propagated almost entirely from layers of the tips. The canes of this species generally grow strong and stocky at the base, gradually becoming slender, and the ends bend down to ground and take root, thus forming a natural layer. The extreme point of cane after entering the ground turns up, forming a large bud from which the cane for the next season is produced. Occasionally more than one plant will be produced upon a single cane, because after the extreme end has taken root, side shoots will put out, and being but a short distance from the earth soon reach it and form well rooted plants. It is sometimes necessary to go over the plantation and assist nature by covering the tips of the canes to ensure their taking root, especially so with buds after the first year, or in places where the wind is constantly shifting them about. All that is necessary is to throw a small quantity of soil on the top of each cane. The time for performing this operation varies with the different seasons, soils, and localities, but is generally from the 20th of August to the middle of September; but care should be taken not to cover too early or too late; if too early, the plant is not sufficiently ripened and the end will rot and no plant will be produced. The canes at the right time will usually show indications of becoming rooted, such as a slight enlargement near the end and a cessation of growth.

The roots will continue to grow until the ground is frozen, and it is better to let them remain until the next spring before taking them up for setting.

Where plantations are large enough to admit of the use of a horse in cultivating, we like to give the plants plenty of room, and, therefore, advise planting the rows of the red five or six feet apart and the blacks seven or eight feet. To prevent the loss of so much ground, some other crop may be grown between the rows the first season, such as beans, potatoes or cabbage, any one of which is better than corn. The plants in the rows may be set from three to four feet apart, and of the red varieties two or three plants may be set in one hill. The red varieties will do just as well to be set in the fall, provided they are covered through the winter with a mound of earth or some other material, or the plants may be dug in the fall and wintered by heeling in or burying for early spring setting. But we think it is better and safer to set the blackcap in the spring, taking the plants up fresh as the operation goes on.

Cultivation should commence soon after the plants are set, and the surface of the ground should be kept level, clean and mellow, not allowing it to get banked up around the hills; a fine tooth cultivator and sharp hoe are the best implements for doing the work. With the exception of from four to six canes to each hill and a like number coming on to take their place the following year, unless plants are wanted for extending the patch all sprouts should be treated as weeds: this for the reds. With the blacks, pinch off the terminal bud of each shoot as soon as it reaches a height of one or two feet. In small gardens there is no better tool for killing weeds and keeping the surface mellow than a common garden rake.

Usually there is no summer pruning done in the garden or field patch except cutting out the old canes after fruiting and shortening in the new growth once early in the summer.

There is a difference in opinion among growers whether the old canes should be removed immediately after they have done bearing or left to die and be removed the next spring. The advocates of both have some plausible arguments on their side. The prompt removal of them does not appear to weaken the plant, enables the growing cane to ripen up better and gives the plantation a much neater appearance; besides, where winter protection must be given, they are in a better condition for laying down. On the other hand, the old canes would afford some protection against the young canes being broken down by winds and have a tendency to hold the snows better in winter; but this is offset by the harbor they afford for insects, mice and other vermin.

Summer pruning is strongly advocated by some, but our most successful growers do not practice it upon the reds, and we think it is of doubtful utility, if not positively injurious in inviting bacterial diseases. With the blacks there is no doubt about the benefit of once heading back, if it is carefully done at the right time. The object is to make strong stocky plants capable of standing alone and full of lateral branches like little trees, that will be loaded with fruit. It consists in pinching off the ends of the canes when they have reached the desired height. It should never be done after the canes have partially made their season's growth, for the removal of foliage and growth at that period will cause the starting of the buds that have formed for next year, and at least partial loss of a fruit crop.

Mulching is advisable for several reasons. It tends to keep the fruit clean from sand and dirt, conserves moisture in the soil and saves in cultivation; but it is better to keep the patch cultivated and clear of weeds until the plants have blossomed and the fruit is formed before applying the mulch. Straw that has been trampled in the yards, marsh hay, cut or crushed cornstalks, crushed cane-stalks or green clover cut when in bloom and applied at once, are the best materials for mulching, and the latter best of all. With the red varieties it appears to me best to do no summer pinching or pruning and to cut them back directly after all growth has ceased in the fall or early the next spring. Various methods of training the raspberry are practiced. Perhaps the cheapest and most convenient is between two wires stretched upon stakes about eighteen inches high upon opposite sides of the row, or the canes may be

fastened up to a wire trellis. In garden culture stakes are often used, to which the hill is fastened in a loose bunch. Very good results have come from growing the reds in loose, continuous rows, headed back so they will stand alone, and mulched heavily to keep the fruit clean.

In this climate winter protection is always beneficial and with some varieties absolutely necessary. The most convenient method practiced at the present time is laying down and covering lightly with earth. With the protection of the blackcaps I have had but little experience, generally trusting to turning a furrow towards the row, banking up and mulching, and to the snow that lodges among them. For more trying situations than mine and for the garden, the throwing up of a mound of earth or even the mouldy material against one side of the plants and binding them over it and laying over them brush, poles, laths or anything else to keep them down and hold the snow, would generally answer. Some practice cutting loose from stakes and placing a forkful of prairie hay, cornstalks or dry grass over them.

In protecting the roots, we begin at the end of the row from which the canes are to be bent and either throw a spadeful of earth against the hill on that side or remove a forkful from the roots to the depth of three or four inches; then step to the opposite side and with a fork bend the whole hill over until it lays upon the ground and is fastened by a boy or another man throwing sufficient earth upon the top to hold it there; then proceed with the next hill in the same manner, laying it over so the tops come beside the space of the first; and so on through the row. All of the plants in the row should be bent in the same direction. To bend the plants sharply over and cover with earth would cause many of the stronger ones to break just above the roots, but they will bend over the mound, or in case of taking a little earth away in the root, without any injury. After the row is all down two men, one on either side, with spades can put on a light covering of soil very quickly, or they may generally be sufficiently covered with a horse and plow throwing a light furrow towards them from each side. It may be necessary to follow with shovel and increase the covering here and there. In the spring as soon as hard frosts are over, begin at the end from which the plants were bent and with a fork throw and push the covering aside and gently lift the canes out of the soil, taking pains to level the ground and not leave it heaped up against the hills. This work should not be done when the ground is wet and sticky, unless the season is so late that there is danger of the canes decaying unless exposed to the air.

Best varieties for Minnesota. The Turner is about the hardest of all the red-fruited varieties, and the fruit is of a very superior quality for family use. It is early and in flavor surpasses all of its class. It is an inveterate producer of suckers or plants, and to do well it must be kept in hills of five or six canes or in thin rows and all other plants kept hoed out except a sufficient number to take their place for next year's fruiting. Next to the Turner comes the Marlboro, just a little later in ripening, fruit of large size, fine appearance, firmer for market but not so good in quality. The

plant is of more dwarf habit than most of the others; thus it can be planted closer between rows, and it stands up very well without staking or tying, and except for the convenience of applying winter protection would do much better in rows than hills. The Brandywine has been considerably grown in this state; it is one of the hardiest, if properly cared for; very productive, fruit fine color, not the best in quality, but takes very well in the market.

Most popular of all is the Cuthbert. It is a rank grower, the canes on rich soil often reaching a height of seven to eight feet. The fruit is of the largest size, fine appearance and excellent quality and later than the others in ripening, and is a great favorite for both family use and market. There are a number of new varieties being introduced, but none that we have tasted excel those mentioned, and some are worthless.

Blackcaps. In this class there are a considerable number of varieties from which selections may be made. The Souhegan and Tyler are best known, as being the earliest to ripen their fruit. They are, however, but two or three days earlier than the old Doolittle and not as productive. We would prefer the Doolittle to either of them, if we could get genuine plants of it, but it is getting to be badly mixed and run out. From the many favorable reports being received of the Palmer, we are inclined to the belief that it will soon take the first place for early. The Hilborn and Ohio are in the lead as medium early. The Ohio is one of the hardiest, a strong grower, produces abundantly, markets well and is much esteemed for drying and evaporating. The Older and Kansas are said to produce fruit of finer quality for table use. For late the Gregg and Nemaha are most generally grown; in size and quality of fruit and productiveness they differ but little; both are strong growers, a little tender for this climate, but the Nemaha is thought to be the more hardy of the two; the fruit is very popular in the market.

The Shaffer is a variety that is now rapidly growing in favor. It is not a true blackcap, although it resembles it somewhat in habit and growth. It is thought by many to be a hybrid between the red and black. The fruit is of a purple red color, of largest size. The plants are strong growers and very productive, and, probably, as hardy as any of the blackcaps. The fruit is juicy and high flavored and especially valuable for canning. It is propagated only from layers of the tips. From the brief trial we have given it, we are led to believe that it will prove invaluable as a home berry and for market where much canning is done, and whether it be a hybrid or a sprout from the blackcap, or a separate and independent species does not detract from its value. If it be an accidental hybrid we may expect to see it soon followed by other crosses between the two species; and the skillful experimentalist will yet be able by judicious crosses between such varieties as the Cuthbert and Nemaha to produce a plant that is hardy, vigorous and productive, with a fruit of finer color and better flavor than any now known.

Irrigation.

IRRIGATION FOR MINNESOTA.

S. M. EMERY, DIRECTOR MONTANA EXPERIMENT STATION,
BOZEMAN, MONT.

By a grievous oversight on the part of the early settlers in the semi-arid states, the subject of irrigation has been badly treated.

It was first considered as a misfortune that there should have been a necessity for the artificial use of water to secure crops.

The phenomenal crops were very gratifying to the farmer, and he was always found to be willing to state his enormous yields, but he gave unwilling assent to the pressed question as to whether he was compelled to the artificial use of water. It was kept in the background, and none were found who were proud of the fact that there was a compulsion to irrigate before one could reap.

These points are being better understood, and thoughtful men see in the future that it is only a question of time until the semi-arid regions will be heavily taxed to augment the depreciated cereal food supply of the hitherto great bread-producing states, whose lands are fast losing their natural fertility from a wretched system of injudicious cropping; and that this hope finds foundation mainly upon their possibilities to keep up the normal fertility of their soil from the effects of irrigation.

You are all familiar with the experiments of the German agriculturist, who took clean sand, washed it, then cut from its surface by the action of acid all foreign matter, and using this prepared sand as soil planted therein grain, which by the action of water and light was developed to the milk stage, absolutely being deprived of any nutrient except such as was afforded in the water: and so it is with those who are observant; they know that in the irrigation season that the water is impregnated with vegetable matter, swept into the streams and water courses by the action of the floods, originating from melted snow or the spring rains, and that the fine sedimentary deposit enriches the soil and gives the young and tender plants and rootlets that form of plant food best adapted to their wants.

Is irrigation practicable in Minnesota? Most assuredly, not over the entire cultivated area of the state, simply for the reason that there is not water that can be conducted out and onto all the surface of the state. On the other hand, there are many farms through which pass spring brooks that would afford water to much of the bottom land through which they flow, of no value except in pastures for stock purposes, and more of a nuisance than a blessing when overflown by spring freshets.

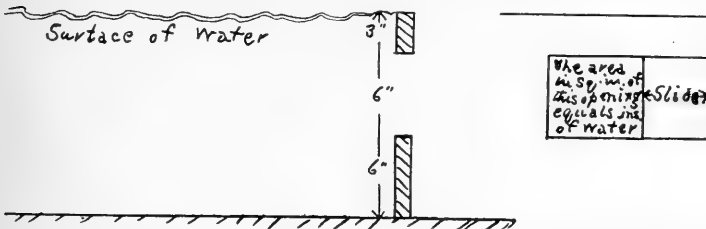
The amount of water required is far less than is generally supposed, a miner's inch to the acre being the usual standard; though

some use double this quantity, while other good managers, by using the water at night as well as day, can get along with from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch per acre.

A miner's inch is defined by statute in Montana, as follows:

"The measurement of water appropriated under this chapter shall be conducted in the following manner: A box or flume shall be constructed, with a head gate placed so as to leave an opening of six inches between the bottom of the box or flume and lower edge of the head gate with a slide to open at one side of and of sufficient width to close the opening left by the head gate, by means of which the dimensions of the opening are to be adjusted. The box or flume shall be placed level and so arranged that the stream in passing through the aperture is not obstructed by backwater or an eddy below the gate; but before entering the opening to be measured the stream shall be brought to an eddy and shall stand three inches on the head gate and above the opening. The number of square inches contained in the opening shall be the measure of inches of water."

The following cut illustrates the above method of measurement:



The form hereunto attached is a copy of the notice by which water is taken up or claimed, and is made legal by claimant duly executing and filing with the proper office of record:

NOTICE OF WATER RIGHT.

STATE OF MONTANA, }
COUNTY OF GALLATIN. } SS.

To All Whom These Presents May Concern:

BE IT KNOWN That..... of..... in said county and state, do.... hereby publish and declare, as a legal notice to all the world,

I. That..... ha... a legal right to the use, possession and control of, and claim..... inches of the waters of..... in said county and state, for irrigating and other purposes.

II. That the special purpose for which said water is intended to be used, and the place of intended use is

III. That..... ha... taken said water out of, and diverted it from said..... by means of..... which said..... is..... inches by..... inches in size, and carries or conducts..... inches of water from said.....; said..... taps and diverts the water from said stream at a point upon its..... bank..... thence running, or to run, to and upon said described land (and through said land, if..... so desire, to any requisite point of final discharge).

IV. That..... appropriated and took said water on the..... day of..... A. D., 189..... by means of said.....

V. That the name..... of the appropriator..... of said water.....

VI. That..... also hereby claim said ditch and the right of way therefor, and for said water by it conveyed, or to be conveyed, from said point of appropriation to said land or point of final discharge, and also the right of location upon any lands of any dams, flumes, reservoirs, constructed or to be constructed, by..... in appropriating and in using said water.

VII. That..... also claim the right to keep in repair and to enlarge said means of water appropriation at any time, and the right to dispose of said right, water, ditch, or said appurtenances, in part or whole, at any time.

CLAIMING THE SAME, All and singular, under any and all laws, National and State, and rulings and decisions thereunder, in the matter of water rights, and specifically under sections 731 to 735, inclusive, and 738 and 741, General Laws, Laws of Montana, Revised Statutes of 1879, or as amended, and under an act of the Legislative Assembly of the Territory of Montana, entitled "An Act relative to Water Rights," approved March 12th, A. D., 1885.

TOGETHER WITH ALL AND SINGULAR, The hereditaments and appurtenances thereunto belonging, or appertaining, or to accrue to the same.

WITNESS..... hand..... at..... State of Montana, this day of..... 189.....

STATE OF MONTANA.

COUNTY OF GALLATIN. } ss.

.....having first been duly sworn, depose....and say....that....he..
 of lawful age and.....the appropriator....and claimant....of the water and
 water right mentioned in the foregoing Notice and Statement of appropriation and
 claim, and the person...whose name..... subscribed thereto as the appropriator...
 and claimant....; that.....he.....know....the contents of said Notice and Statement
 foregoing, and that the matters and things therein stated are true.

Subscribed and sworn to before me this..... day of.....A. D., 189.....

Under the laws of Montana, water cannot be taken up solely as a speculation but should be kept in use each year, nor will the courts permit a man to hold an amount of water largely in excess of his own requirements should other parties on the stream need the water, even though he hold a prior right.

Water rights date by priority, that is to say, first claimant, having a use for all water claimed under his right, *i. e.* so many inches, has the right to divert such an amount of water from the stream, through his ditches, onto his land; the second claimant proceeds in like manner, and so on down to the last man filing notice.

It is very customary, where water is taken a long distance and from streams of magnitude, for two or more farmers to join and construct a partnership ditch, the rights of each partner being defined; where a large number of owners are interested, it is the custom to appoint one whose duty it is to apportion to each man his lawful share of water.

Unless the ground over which the ditch passes is much broken in contour, it is not customary to call into use the services of a civil engineer, but the location of the ditch is established by the use of a triangle and plumb bob.

Ditches carrying from 50 to 100 inches of water, (the usual size of which is from 3 to 4 feet in width, and 12 to 18 inches in depth) should have a fall of from $\frac{1}{8}$ to $\frac{1}{4}$ of an inch per rod.

By means of a level or a good barometer, it is easily discovered how far up stream one must go to take out the ditch. Suppose the tract of land to be watered lies 100 feet above the surface of the stream from which the water must come and that the natural fall of the stream be 50 feet per mile, a ditch to conduct the water, or to place it on a level with the land to be watered, should be two miles in length; and in addition to this, an allowance must be made of from $\frac{1}{8}$ to $\frac{1}{4}$ inch per rod for the distance between the point of diverting the water from the stream and the point of delivering, traversed by the ditch.

If $\frac{1}{4}$ inch be the desired fall to the ditch, a triangle that will measure $\frac{1}{2}$ rod on each of its equilateral sides should have a strip or block $\frac{1}{8}$ of an inch thick nailed to the bottom and at the extreme end of the base of the triangle, a plumb bob being suspended to the apex by a cord long enough to allow the bob to swing down and over the center of the triangle. Placing the base of the triangle (the one to which the $\frac{1}{8}$ of an inch block is fastened) on the level of the water, a stake is driven on which the $\frac{1}{8}$ of an inch lift is placed, and this stake driven into the earth until the plumb indicates the triangle to be level. The triangle is then moved onto the stake just driven, and another stake set in the ground, on which the $\frac{1}{8}$ of an inch lift is placed, and so on, until a series of stakes be driven that

will indicate the course the ditch must take from where it leaves the stream to the land to be irrigated, the general course of which will have a regular fall of $\frac{1}{4}$ of an inch to the rod. In bringing the water onto the tract, care will be taken, of course, to have it reach the highest point on the tract first.

Construction of ditches is largely accomplished by team, plow and scraper work, the earth being banked on the lower side of the ditch, and in ordinary soil can be constructed for \$75.00 per mile.

The water is conducted onto the land by a series of lateral ditches, that are smaller than the main ditch.

On land that has a fall of one-fourth of an inch to the rod, from the main ditch the laterals can be laid on straight lines and at right angles to the main, or head, ditch and about two rods apart. They are usually constructed by throwing out two furrows with a two-horse plow, following this with an implement known as a lizard, made of a block of wood, which shapes and smoothes the bottom of the furrow, leaving a good run to the ditch.

At intervals of two rods along the lateral ditches, temporary dams are constructed by throwing half a dozen shovels of earth into the bottom of the ditch, the object of which is to hold the water in the lateral ditch until it has done its work. This is accomplished as follows: The laterals are not opened through to the head ditch, but a small bank is left which is broken down at the time the water is conducted into the laterals. Many use what is called a *dam board*, a circular sharp-edged board, a trifle larger than the shape and contour of the ditch. When ready to turn the water into the laterals, this dam board is plunged into the bottom of the main ditch and reinforced by earth, the result being the water is dammed in the head ditch; the earth is then broken down into the highest lateral ditch, (irrigation, of course, being from the highest side of the land to the lowest), and held in the lateral ditch by the first temporary dam, say two or three rods from the head ditch; openings are made in the rim of the lateral ditch, (on the lowest side of the ditch) and the water permitted to flow out and upon the land between the laterals. *Do not allow it to escape into the next lateral.*

When the soil is thoroughly saturated with moisture between the laterals and along the entire distance *above the first dam in the lateral*, the first dam in the lateral is broken down, the openings in the lateral above the first dam closed, and the space opposite the second dam is similarly treated, and so on until the territory lying between laterals No. 1 and No. 2 is completely saturated; then the dam board in the head ditch is moved down to lateral No. 2, the opening into lateral No. 1 is closed, and the operation repeated until the water has been in all laterals, and the entire surface of the soil completely saturated with moisture. A good hand will irrigate, under favorable conditions, six acres per day.

The tool used in irrigation is a long-handled, round-pointed shovel. Rubber boots are a *sine qua non*, as is a rubber coat. Once irrigation is begun it never stops for rain, and the secret of the success is that the soil never naturally becomes as wet as from irrigation; the water cannot escape until the soil is so wet that a man will often sink to his knees at each step; then you get a complete solution of the salts in the soil, and by no natural means can this be so well accomplished.

Lands are irrigated once, twice and thrice in a season, depending on conditions and locations.

Grain is seldom irrigated until up, as the soil bakes quickly and, unless it be hoed crops, it is impossible for cereals to force their delicate shoots through the hard surface of the soil.

For strawberries it is of prime importance. I have eaten matured fruit from runners the same year of their production, and instead of waiting until August for the summer rains to develop runners, they start on irrigated land in May.

Blackberries, raspberries, currants and gooseberries attain complete fruition only under the beneficent action of water.

Apple trees will never root-kill when the soil is susceptible of the most perfect inundation in the months of October or November.

Ditches for the conduct of water to be used for irrigation purposes enjoy under western state laws the right of eminent domain.

The practice of crossing gulches or ravines by means of wooden flumes is discouraged, and never practiced unless absolutely imperative; *first*, it is much more expensive to manufacture and maintain the flume than the longer ditch required to cross any ordinary flume; and *second*, the season is so short in which it is necessary to have water in irrigating ditches for ordinary grain crops, (usually in the months of June or July) that the flumes when dry shrink and warp, so that it is difficult to make them carry water after being once dried up.

New ditches do not carry through them the same amount of water as will the same ditch after water has passed through it for some time. This is easy to explain; the seepage from the unsettled condition of the sides and bottom of ditch is necessarily great, until the surface over which the water passes becomes coated or puddled by the silt borne in the water. On extremely sandy soil it might be desirable to puddle the ditch with a strong solution.

The ordinary farmer will pooh, pooh at the desirability of such work, and will prefer to do business on the old plan of looking to Providence for the rain that falls on the just and unjust.

You that are engaged in horticultural pursuits, can well afford to look into this matter, remembering that in casting about your farms and nurseries for lands that can be watered, that each acre upon which you can conduct water means four acres, as its production is increased from two to three fold from irrigation; and, if this be true, the acre that by the same labor doubles or triples its yield, is as valuable as four times the land, considering the material reduction in labor involved in the cultivation of four acres as compared to that of one.

As nearly as can be estimated after the ditches are once constructed, the cost per acre for applying the water will not exceed one dollar per annum.

I venture the assertion that root-grafts, set into irrigable lands, will start into 92 per cent.; that with the proper application of water not a single graft will ever winter-kill, and that yearlings cut to the ground in April will by three irrigations and perfect cultivation make a four or six foot tree in the second season's growth.

So far as its effects on fruiting is concerned, I have personally seen Oldenburg trees, seven years set, that averaged one thousand pounds to the tree of the choicest fruit. I have seen currants and gooseberries that, at the rate of *thirty cents per quart*, yielded \$1,300 per acre; this, of course, at ten cents, the usual eastern price, would amount to \$133.00 per acre.

Strawberry growers turn the water into their beds each night, and, as a result, their last pickings are as fine as the first.

Experiment slowly; try an acre or two, and see how it justifies, and, thus, if you are not satisfied with the result, not much time or money will have been expended in vain.

Gleanings.

Annual Meeting, 1894.

The annual session of this society held in Minneapolis, January 9, 10, 11, and 12, 1894, was probably the largest in point of attendance ever held in its history. It was a very interesting and enthusiastic meeting and a large amount of valuable material has been gathered as one result of it, which will appear as rapidly as possible in the society's magazine. One hundred and thirty-five annual members were placed on the rolls during the session, an unprecedented number. Two life members were also added to our list.

The display of fruit, flowers and vegetables was excellent, and especially in the case of fruit unexpectedly good, as our state produced so poor a crop of apples the past season. The best grapes ever exhibited at that season were shown. An exhibit of a large number of varieties of apples and grapes from our state exhibit at the World's Fair added much interest, many of the plates shown having been exhibited there during the fall months.

After all the greatest benefit of these meetings is realized by those who attend. It is a season of refreshing, indeed. Try it yourself next year and you will at once drop in the ranks of "regulars."

Horticultural Clubs.

The executive committee has decided upon a plan for the formation of Horticultural Clubs throughout the state by enlisting the co-operation of the school district officers, particulars as to which will appear in our next issue, though the plan is to be pushed at once.

It is hoped this may be the means of arousing a more general and intelligent interest in horticulture, and that the large sum of money annually spent amongst us for fruit trees, vines, seeds, flowering plants, etc., may be made to yield the results that it certainly would were the information gathered by this society thoroughly disseminated.

Wisconsin State Horticultural Society.

The twenty-fourth annual meeting of the Wisconsin State Horticultural Society will be held at Madison, Wis., February 6th, 7th and 8th, 1894.

R. C. Keel, of Rochester, has been appointed by the executive committee a delegate from the Minnesota Society, and his report of the meeting will probably appear in the March issue.

Additions to Society Library.

The following books have been added to the library since January, 1894, viz.:

Amateur Fruit Growing, by Prof. S. B. Green, State Experimental Station, (author.)

Catalogue of Russian Section of World's Fair, donated by C. McC. Reeve, Minneapolis.

Minnesota Legislative Manual, 1893.

Report Secretary of Agriculture, U. S. A., 1892., donated by J. S. Harris.

Report of Massachusetts Horticultural Society 1889, Part I.

"	"	"	"	"	"	"	II.
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"	"	"	"	"	1890,	"	I.
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"	"	"	"	"	"	"	II.
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"	"	"	"	"	1891,	"	I.
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"	"	"	"	"	1892,	"	I.
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"	"	"	"	"	1893,	"	I.
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Received from the secretary.

Death of Dr. Joseph Hobbins.

THE FAMOUS PHYSICIAN AND "FATHER OF HORTICULTURE IN THE NORTHWEST."

(From Minneapolis Tribune.)

MADISON, Wis., Jan. 24.—Dr. Joseph Hobbins died at his residence in this city at 6:15 this evening from the effects of la grippe. On account of his activity in promoting horticultural interests he gained the title of "Father of Horticulture in the Northwest." He was president of the Wisconsin State Horticultural Society five years.

Communication from the Secretary.

Owing to sickness in the family of the reporter, it has been impossible to get copy of discussions to accompany papers which it was intended to have published in this issue, and others have necessarily been substituted that were intended for a later number.

(SECRETARY.)

Illinois Report for 1894.

The annual report of the Illinois State Horticultural Society of the meeting held about Dec. 12, 1893, is just received—Printed and delivered in six weeks! Such a feat is worthy of special notice.

THE MINNESOTA HORTICULTURIST.

VOL. 22

MARCH, 1894.

NO. 2

IRRIGATION APPLIED TO MINNESOTA.

A. W. SIAS, PUEBLO, COL

Through the well known kindness of your honorable secretary permission is given me to prove how little I know concerning that great "motive power" to western civilization; irrigation. Thirty years residence within the rain belt of Minnesota, and only three years in dry Colorado, has failed to prepare us for an intelligent discussion of this important subject.

Irrigation thus far in Colorado has been too largely superintended by tyros, or "tender-foots," with little experience (like myself); *this*, together with cheap ditches that failed to bring water when most needed, accounts for many failures. But when you find an intelligent man here—as I did last November at Canon City in the person of W. B. Felton, who has mastered the true science or principles of irrigation—then you may be able to get some suggestions in regard to the advantages of a perfect control of water during an unusually dry season (for this dry section), and compare the result with the more "chance-like" system of operations in a similar dry season anywhere within the rain belt of Minnesota. I append here Mr. Felton's own statement—proceeds from nine acres.

"GOOD AS A GOLD MINE.—W. B. Felton has kindly furnished us with the following figures relative to the receipts and expenditures of his orchard in South Canon for the year 1893. All of this crop was harvested and sold before November 1st:

Strawberries...	\$77.79
Cherries	53.05
Currants	4.45
Gooseberries	8.50
Raspberries.....	9.25
Peaches.....	58.31
Plums	6.00
Grapes.....	222.06
Pears.....	174.19
Melons.....	28.08
Early apples.....	160.86
Late apples.....	5.777.59
Total.....	\$6,515.13

"The expenses for the year were \$1,535.87, leaving a net profit of \$5,019.26. When we consider that less than nine acres are under cultivation, five of which are planted to winter apples, and, also, that outside the apple crop everything else was a short crop, the product was something remarkable and not equalled within the state, we believe.

There are many larger orchards in Fremont county which are wonderful producers, but Mr. Felton has always contended that ten acres are enough for any man, and the manner in which he conducts his place and the success he has had with it in the past few years would indicate that he is not far from right.

"It is not at all strange that the price of fruit land in this county ranges from \$100 to \$1,000 per acre, when such land has been known to pay for itself in one and two years."—*The Canon City Record*.

Mr. Felton is postmaster at Canon City and a very busy man, but he kindly showed us over his highly cultivated acres, and we soon brought up at the cider press, where a "wee drop" of unfermented apple juice much refreshed us after our long walk. If Bro. Dartt or any other good prohibitionist should happen to call me "to order" right here, and should like to know what cider has to do with irrigation, please say to those noble reformers that I shall still claim the floor on the plea that irrigation comprehends both plant and throat irrigation, and that the latter is kept up here in Pueblo with a mighty force, and that with no lack of energy, zeal or cash—unceasingly—night and day; while state ditch No. 1, and many other contemplated ditches, have been obliged to halt for the want of "free coinage of silver." There is no *animal* industry or branch of irrigation more successful in Pueblo at present than *throat irrigation*; but our last election gave to women full and equal suffrage; hence, the man who reports to your honorable body on the subject of irrigation from Pueblo five years from now, may ignore *throat irrigation* altogether.

The altitude at Canon City is between 5000 and 6000 feet above sea level, too high for successful peach culture. Mr. Felton grows his on a similar plan to that of Mr. Gideon. Mr. Felton's figures would look as though he pinned his faith mostly on winter apples; but his pear trees are beauties, though not so abundant. His grounds are nearly level, or just right for easy and successful irrigation.

Grapes are a success in this place, but Mr. F. says that prices are so low that there is no money in them.

Jesse Frazier, of Florence, Colorado, eight miles east of Canon City, is one of the oldest and most extensive fruit growers in Colorado. He settled there about the same time that I settled at Rochester, Minn. We both brought our first trees in wagons across the plains, ahead of railroads in either state. Mr. Frazier has thirty-five acres in orchard, and told me he had produced 35,000 bushels in a single season. He proved that a man who understood thorough irrigation could coin money out of apples and pears.

After producing 103 distinct varieties of the apple species in 1882 in my five acre orchard, the tornado struck it and ruined the labor of many years, and proved that, while a man might contend against the elements—to the tune of 50 degrees below zero, and produce many apples in spite of it—yet when in connection with this extreme cold he must meet with such a tornado as struck us August 21st, 1883, at Rochester, Minn., then he has some excuse for being found on the wrong side of the ledger or cash book. Mr. Frazier can show both apple and pear trees over two feet in diameter; while it might

bother me to find a tree of one-half that size from my first planting. This difference is due to irrigation, as trees left to their own "sweet will" make a greater annual growth in Minnesota than in Colorado. Thousands of trees are killed here annually by unskilled irrigators leaving the soil dishing about the tree in adobe soils. They fail to see the point that all trees planted on such retentive soil must either have *natural* or artificial drainage.

In connection with irrigation you can employ heavy mulching with wonderfully good results, particularly with street trees. In the spring of 1891, I planted 1,100 trees in small parks here, known as Central Park and Fairmount, eleven varieties; only one hundred in Fairmount Park, which were all well mulched, and only six mulched on Central Park. All those mulched made a wonderful big growth; in fact, they are more than double the size today than where not mulched. I shall not advise you to irrigate in Minnesota, with your numerous lakes and rivers, and timely precipitation (I have no hint at tornadoes) to moisten the air and soil. Add *intense cultivation* and a wagon load of stable manure to each tree, and a good drove of insectivorous animals, vulgarly known as "rooters," to keep *things moving* and to see that no vile codlin moth has time to reproduce his loathsome self in a single apple. Attend to all these details carefully, and you are in shape to compete with any part of the Great American Desert where irrigation is the sole dependence.

CONSERVATION OF MOISTURE IN THE SOIL.

PROF. S. B. GREEN, ST. ANTHONY PARK.

The dry weather of the past season has brought this subject before the agriculturist as never before, and all growers of crops have become impressed with its importance. The question of irrigation would be an important one for us if there was any large portion of this state that was situated so as to permit of artificial application of water. There are favored sections where artesian or other water may be used for irrigation to advantage, but generally the planter must depend on the annual rainfall and by it he must too often gauge his crops. The importance then of husbanding this water is evident.

The water which reaches the soil is dissipated; first, by running off the surface of the land into the streams; second, by passing through the surface soil to the underground water system; third, by evaporation from the surface of the land. The loss of water by transpiration through the leaves of growing crops is necessary to success, and over it we have little or no control, and it is, therefore, not discussed here.

(1.) The loss of water from its running off into streams is quite serious on hillsides and where the land is impermeable. The methods of preventing this are numerous and must be modified according to the crops grown on the land and its contour. Where it is practicable, as, for instance, where the land is devoted to small fruits, and in case of some other crops, this may largely be controlled by covering the surface of the land with some kind of mulch, which

by impeding the flow of the surface water allows it to soak into the ground. The necessity of this in the case of clayey hillsides is evident; on them, the surface of the soil, when exposed, will become so hardened that the rain falling in summer showers penetrates the land so very slightly that it is all evaporated after a very few hours of sunshine, thereby, perhaps, rendering the land harder and more impermeable than before.

(2.) The loss of water by its passing through the soil to the underground water system may be considerable, but over this factor we have very little control. The water-holding capacity of soils varies very much, and successful cultivation depends largely on their proper selection for different crops. This quality may often be increased by the addition of organic matter to the soil. In some parts of Europe even the prunings of grape vines and willow twigs are often used to mix with land to increase its humus; but the plowing in of green crops and the use of stable manures are probably the most practical means for improving the water-holding capacity of the soil in this section.

(3.) The loss of water by evaporation from the surface of the land must be regarded the prime factor in the dissipation of the water in the soil. This may be limited (a) by wind-breaks, (b) by mulching the surface of the soil and (c) by cultivation of the surface soil. This latter method of prevention is not discussed here.

Wind-breaks. It is necessary to allow of a circulation of air among our crops in order to prevent serious losses from fungus diseases. When the air is very much confined and circulates but slowly, as in fields closely shut in by wind-breaks, there is liable to be serious loss from rust, blight, mildew and the many diseases to which plants are subject, but, nevertheless, we can secure sufficient circulation of the atmosphere to get its beneficial action in preventing diseases and yet avoid the greatly increased rate of evaporation due to its very rapid circulation. How much the rate of evaporation is increased by exposure to the winds was clearly shown by the experiments of Prof. T. Russell, Jr., of the Signal Service, in 1887. The results of these experiments show that with the temperature of the air at eighty-four degrees and a relative humidity of fifty per cent. evaporation with the wind blowing at five miles an hour was 2.2 times greater than in a calm; at ten miles, 3.8; at fifteen miles, 4.9; at twenty miles, 5.7; at twenty-five miles, 6.1; and at thirty miles per hour the wind would evaporate 6.3 times as much water as a calm atmosphere of the same temperature and humidity. Now, if it is considered that the winds which sweep our prairies average a velocity of ten or more miles per hour, and not unfrequently thirty miles an hour, the losses which may be prevented by the judicious use of wind-breaks can to some extent be appreciated. Then, too, it is probable that the terribly drying effect of some of the winds which occasionally sweep over the prairies is not considered in the above figures, nor is the loss which comes from increased transpiration from the foliage, and which is no inconsiderable item. It will be understood from these facts that the wind is an important factor in the dissipation of the water in the soil, and that its injurious action may be prevented to a considerable extent by the judicious use of wind-breaks.

Mulching. Evaporation from the surface of the soil may be largely prevented by the use of mulch, and to some extent by the cultivation of the surface of the land. The use of a mulch is quite generally accepted as being desirable around trees, shrubs and small-fruit plants, but its exact value is seldom expressed in figures. At the Experiment Station, the past season, the value of a mulch was clearly shown in many cases. In one case a strawberry bed growing on open clayey loam which was heavily mulched with oat straw produced a fine crop of strawberries, while strawberry beds in the immediate vicinity, not so treated, were nearly or quite a failure. In fact, this crop was generally a failure in eastern Minnesota the past season, with rare exceptions. The success at the Experiment Station could not be ascribed to the use of any particular variety, since all the well known kinds were productive. It would seem to be partially due to high cultivation, but chiefly to the use of a heavy mulch between the rows, which had become very compact from being under the snows all winter. Some analyses made by Prof. Snyder, the station chemist, showed the results set forth in the following table, in which the term "mulched bed" is used to signify the rows of the strawberries which at the time of trial were covered with about three inches of broken compacted oat straw; "cultivated soil" means the land in an adjoining row which was kept stirred by a horse cultivator; "uncultivated soil" refers to parts of the strawberry beds where the plants had failed and, consequently, no cultivation whatever was given the land, neither was it mulched. The data under the heads of cultivated and uncultivated land were probably much influenced by the proximity of the mulched rows, which, undoubtedly, greatly increased the amount of water which they contained; so the results in the table are much modified by it and do not appear as evident as they would otherwise. Great care was taken in selecting the samples to have them from soils of similar appearance, and the soil of the whole bed was very uniform.

DATE.		Depth of sample.	Mulched beds. Water.	Cultiv't'd soil. Water.	Uncult'd soil. Water.
June 29.....	Surface soil	4 inches	24.30 pr. ct.	19.2 pr. ct.	18.01 pr. ct.
June 29.....	Sub- "	.....	25.93 "	19.93 "	20.01 "
June 30.....	Surface "	.....	20.63 "	15.48 "	.....
June 30.....	Sub- "	.....	21.07 "	16.2 "	.....

From this table, it appears that the use of a mulch on the surface soil increased the amount of water it held about five per cent. as compared with soil which was cultivated. Calling the weight of a cubic foot of dry soil seventy pounds, which is approximately correct, it will be seen that the use of a mulch resulted in making each cubic foot of the surface soil retain about three and one-half pints of water more than it otherwise would. This is equivalent to increasing the amount of water in the upper one foot of soil of one acre by 605 barrels. Of course, these figures are only approximate and there are many possible sources of error, yet it would seem that enough was shown to demonstrate that the use of a mulch might easily make the difference between success and failure in maturing a crop of this nature.

Physicists estimate that in order to be in the best condition for the roots of the cultivated plants to act, the soil should contain

from one-third to one-half the weight of water it would contain if saturated. In this case, it was found that soil when saturated would hold fifty-five per cent. of water and, as the mulched contained about twenty-four per cent., it was in excellent condition for root action, even in a period of severe drouth.

Use of mulch on a gravelly knoll. At the Experiment Station is a vineyard partly located on a very dry, open gravelly knoll. The vines on this part suffered severely about five years ago from drouth. The following season, they were heavily mulched with stable litter and trash of various sorts, such as is common about most farms, and it has been kept mulched since that time. This mulch had rotted a good deal and, consequently, added considerable organic matter to the soil. As the result of this treatment, the vines recovered and have since yielded good crops of fruit, and even in the past very dry season gave a bountiful harvest, not being seriously affected by the dry weather. On July 25, tests were made for moisture in the soil under the mulch in the dryer part of this vineyard and, as a result, the top-soil was found to contain 18.3 per cent. of moisture and the subsoil twenty-one per cent. There was no land close by with which to compare this, but on the same date the soil in an oat field at the station, which was apparently and, without doubt, much better adapted to holding water than that in the vineyard, contained 3.8 per cent. of moisture, an amount so small that the plants would be powerless to take up any water from it. This would indicate an increase of 14.5 per cent. of water, which is equivalent to eleven barrels in the upper foot of each square rod, or 1,760 barrels per acre, due to the use of mulch on the soil, and this conclusion seemed to be born out by the appearance of the vines. It is my opinion that without the mulch the fruit would have entirely dropped from the vines in the vineyard. On August 4th, the top-soil in the vineyard contained 16.3 per cent. and the subsoil 17.5 per cent. of water, thus showing that, while it had lost some water, it still contained a sufficient amount to enable the roots to work satisfactorily.

Mulched blackberries on the north slope. In the following table is shown the amount of moisture contained under a very heavy mulch on several dates during the most severe portions of the drouth of the past summer. The land where these observations were made is on the north slope of a hill. The east end of it is a little heavy, while the west end is rather loose and gravelly. The land was used for growing blackberries, and the mulch consisted of six inches of old hay put on in the spring.

Table showing water in soil under a heavy mulch on north slope:

DATE.			East End.	West End.
July 22	A. M.	Top-soil	24.1 per cent.	
" "	"	Sub "	23.9 "	
" "	P. M.	Top "	22.1 "	
" "	"	Sub "	19.1 "	
" 25	A. M.	Top "	23.8 "	21.9 per cent.
" "	"	Sub "	20.5 "	23.5 "
" "	P. M.	Top "	20.7 "	15.5 "
" "	"	Sub "	20.2 "	19.5 "
Aug. 4	A. M.	Top "	17.5 "	16.4 "
" "	"	Sub "	18.2 "	17.3 "

On July 22nd the soil in the oat field where the land would compare favorably with the west end of the plat referred to in the preceding table, except in the matter of exposure, contained only 4.2 per cent of water, an amount so small as to be unavailable to the roots of plants.

It will be noticed from the above table that in the thirteen days intervening between July 22nd and August 4th there was a loss of seven per cent. of water, yet the soil still contained 17.5 per cent., an amount sufficient to enable the roots to work to advantage.

On July 22nd the soil in a plat of raspberries which was near to and on land having about the same properties as that referred to in table 1, on which the strawberries were grown, was tested for its water contents. The rows were seven feet apart and mulched to a distance of two and one-half feet on each side. The trials of water were made under the mulch and in the strip of soil two feet wide between the mulch of adjoining rows and where the constantly cultivated soil would probably be much influenced by the proximity of the mulched land near it. The next table shows the result of these trials.

Table showing the per cent. of water in cultivated and mulched land in adjoining rows:

DATE.		Mulched.	Cultivated.
July 27	Top-soil.	17.6 per cent.	12.5 per cent.
.....	Sub	19.3 ..	14.5 ..

It will be seen from the table that even in the case of plots in close proximity, where they must influence one another, there is a considerable difference between cultivated and mulched land in favor of the latter. This difference would undoubtedly be much larger than is shown by the table, if the plots treated had been isolated from one another.

SUMMARY.

(1.) The water-holding and consequently the drouth-resisting qualities of a soil are increased by the addition of organic matter to the soil.

(2.) The loss of water by evaporation from the surface of the soil must be regarded as the prime factor in robbing the soil of its moisture.

(3.) Anything that breaks the force of the wind may make the difference between success and failure in growing crops by lessening the evaporation.

(4.) Evaporation from the soil may be largely prevented by the use of a mulch on the surface.

(5.) The use of a mulch may sometimes increase the amount of water in the upper one foot of soil on one acre by 1,700 barrels, and it probably exerts as much influence on the several upper feet of soil. As the roots of corn and most other vigorous plants penetrate several feet into the soil, the increase due to a covering of mulch must be considerable.

(6.) The use of a mulch on many garden crops will often make the difference between success and failure.

DISCUSSION.

Mr. Plants: I would like to ask Prof. Green what degree of moisture is best adapted to growth.

Prof. Green: The soil about half saturated. About from one-half to one-third.

Dr. Frisselle: I would ask Prof. Green what about the surface of the soil being stirred and being made fine so as to make a mulch. How would that answer instead of hay or straw?

Prof. Green: We did not carry on experiments in that line this summer, but they were carried on at the farm. I had a talk recently with the state chemist, and the results were surprising in that so little difference was shown between cultivation and non-cultivation. Sometimes, it seems that results are very great in cultivated soil and, sometimes, the results do not show the effects of it at all.

Mr. Sampson: Does not the checking of the wind hinder the evaporation of the moisture, and is not that evaporation necessary to the growth of the products; does not increased evaporation give an increased growth?

Prof. Green: To some extent that is possibly true. There must be a large amount of material taken through the plant, but there is this about it, where we suffer most is from those fearful southwest winds. Where they sweep over a field of clover or a lake the effects are not so bad; they take the moisture out of the material over which they blow. A field of clover on the windward side undoubtedly prevents the evaporation of moisture on the leeward. Now, the point that you make is, whether evaporation is necessary in order to have good plant growth. Some is necessary, but I do not want evaporation beyond a certain limit. The point I wish to make is that wind-breaks may increase the amount of moisture in the soil by preventing excessive evaporation.

Grapes.

CROSS-FERTILIZATION OF GRAPES.

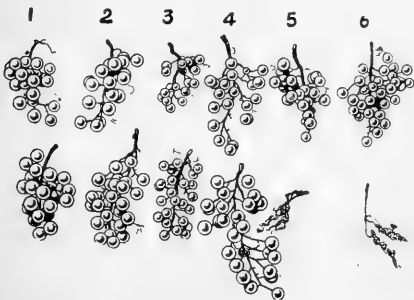
PROF. S. B. GREEN, ST. ANTHONY PARK.

The State Horticultural Society at its last annual meeting requested me to undertake some experiments with the Moores Early grape to determine, if possible, why it was generally such a shy bearer, and, especially, to study its flowers and the necessity for cross-fertilizing them: it being believed by many that this variety was more fruitful when furnished with foreign pollen than when entirely dependent on its own. In working out this special line, it was decided to experiment with the cross and self-fertilization of other varieties, as well as the Moores Early.

The experiments made were as follows: On June 16th, the flowers of the grapes being then not open, six bunches each of Moores Early, Brighton, Agawam, Ives Seedling and Lindley were covered with paper bags which were carefully pinned over the branch above the bunch. By this means the enclosed clusters were protected from pollen of other kinds, which would naturally be conveyed to them by insects and, perhaps, by the wind.

When the flowers of the different kinds had opened and the stigma was in proper condition, three of the bags of each kind were opened and a cluster of the opened flowers of the Delaware grape inserted in them. Thus, there were of each variety three bunches of flowers that were cross-fertilized and three that were self-fertilized. These were allowed to grow without being disturbed until the berries were about one-half inch in diameter, when examination showed that Moores Early, Ives Seedling, Lady and Agawam had set fruit perfectly, whether dependent on their own pollen or cross-fertilized. The Lindley and Brighton, however, while setting fruit perfectly

when cross-fertilized, did not produce any fruit whatever when dependent on their own pollen, but the whole cluster withered away. This is very clearly shown in the plate herewith, in which the clusters in the upper row are from bags in which foreign pollen was introduced, while the lower row shows the clusters from bags which had no foreign pollen. The results show plainly that the Moores Early produces an



1, Brighton. 2, Lindley. 3, Agawam. 4, Lady. 5, Worden. 6, Moores Early.
Upper row cross-fertilized.
Lower row dependent on its own pollen.

abundance of pollen for its own use under the conditions imposed in this experiment. An examination of its blossoms and fruit indicates that there is an abundance of pollen to fertilize the stigmas

under ordinary conditions. This is probably the case with all the varieties of grapes in which the *Vitis Labrusca* enters largely into the parentage. That this is so with the Moores Early is shown from the perfect form of its fruit clusters, in which scarcely a flower fails to produce a well developed berry.

The lack of fruit on the Morris Early grape seems to be due, first, to the frequent lack of development of those prominent buds, often called fruit buds, from which the fruiting canes grow each year; second, the fruit buds not being so abundant as in some other kinds. It is the quite general opinion of many growers whom I have consulted, and in accord with our experience at the Experiment Station, that it requires that more wood should be left in pruning than do most of the kinds commonly grown; and that under close pruning it is generally a light cropper, while under long pruning it is quite uniformly productive.

SUMMARY.

(1.) It is conclusively shown that the Moores Early grape is not dependent on foreign pollen for fertilization.

(2.) The Lady, Agawam and Ives Seedling are also independent of foreign pollen for the production of fruit.

(3.) The Lindley and Brighton grape must be fertilized with foreign pollen in order to be productive and, consequently, wherever planted, should be near some of the strongly staminate kinds, and should never be planted alone.

GRAPES.

QUESTION.

“What is the best system of training grape vines to produce the best results for a long term of years?”

Gen. C. C. Andrews: Before that question is answered, I would like to ask Prof. Green what is understood by “long pruning?”

Prof. S. B. Green: A long cane instead of a short one. Ordinarily, a grape vine will bear ten times as much as it ought to bear. It is found that the pruning adapted to the Moores Early applied to the Concord would yield only half a crop.

Gen. Andrews: Does this refer to the number of leaves left above the bunch?

Prof. Green: No, it refers to the pruning in the fall.

Mr. S. P. Jennison: While we are on this question of training, I wish to say that I promised Mr. Hillman to send the plan I saw used by Mr. Brown, of Wacouta county, and I will make a brief statement if the society will listen. His plan saves the putting up of a trellis or any other support. He makes a support for each vine, and he makes it by taking a piece of board

fencing five and one-half feet long, and of these pieces of board he puts two together so they resemble a letter A, the top being nearer together than the bottom, the bottom being about two and one-half feet apart, and two pieces of board are nailed across those upright pieces; then he makes a hole through the cross piece near the top, within a foot of the top, and through that hole he inserts the end of a post, the post about five feet long, setting the other end on the ground at about four and one-half feet distance from the line in which he sets this fence board letter A, which he sets on the north side of each vine, the vine itself being at the foot of this letter A. The post being set this way, the whole support forms a tripod. To support the vines he nails a few light sticks across the top, as long as he wants his vines to run, and spreads them out, and the vine grows something after the fashion where they are trained on a trellis. His summer pruning is made with the sickle or a sharp knife. He raises very good Concords; he had no other.

The great merit is the ease with which he disposes of them in the fall. When he has gathered his grapes in the fall, he prunes the vine and lays it down, drawing it to one side; then he takes the post and the whole support out of the way, lays his grape vine down towards the north, in the direction it has been inclined, picks up the trimmings, lays them over the grape vine, and then takes his A support and lays it over all; when he has done this he has taken care of his grapes for the winter. The leaves and brush catch the snow and hold it and his letter A and the post lying over the vine prevent the snow blowing away; and he told me he did nothing else but that. The thing I did not like about it was that if he wanted to keep his vineyard free of weeds, which it did not appear in the fall that he did, he would find three posts besides his vine to catch his hoe and cultivator every time; I thought that was the reason some of the weeds had got the better of him. He said, however, it did not interfere with the growth of his grapes.

Dr. Frisselle: How large is this gentleman's vineyard?

Mr. Jennison: Perhaps fifty vines, perhaps more.

Dr. Frisselle: Would you think that was a cheaper way than using posts and wire?

Mr. Jennison: I never made a calculation. If any one had the material and had nothing to do in the winter, it might be. I thought I would try it a year ago, but several things interfered.

Mr. Bass: Those weeds should have a tendency to stop the leaves and snow. [Laughter.]

QUESTION

“What varieties of grapes need to be planted together to produce the best results?”

Pres. J. M. Underwood: I suppose that question was asked in order to bring out the matter of proper fertilization of blossoms. I do not think much attention has been given to the proper fertilization of grapes, unless it has been at experiment stations. The only thing I have seen in regard to it was brought out in the report of the experiment stations at Geneva, N. Y., last year. I cannot mention the different varieties of grapes now, but I know the report referred to the Moores Early not having a perfect blossom, and that it needed some other fertilizing variety to insure a crop. Among a number of our best varieties the Delaware, I recollect, was one that is perfect in blossom, but I do not remember what the different varieties are now. This is published in the bulletins of the experiment station at Geneva, and is the best way to get information on that subject I know of.

QUESTION.

“What length of cuttings makes the best vines, and when and how should they be planted?”

Mr. E. H. S. Dartt: Make the cuttings about a foot long, cut them in the fall and plant them in the spring, and put them under ground to within an inch of the top.

Prof. Green: What kind of soil?

Mr. Dartt: That has nothing to do with the question. (Laughter.)

Mr. J. S. Harris: I set the cuttings two in a place where I want the vine to grow, so that the bottom of the cutting will not be more than eight inches below the surface, and the top bud not more than a half-inch below. I set them with the tops together, and if both live I can take up one of them without disturbing the other. If I have plenty of wood I make only one cutting. We take that wood and also some of the old wood it grew from, and leave a little piece of the two-year-old wood on that piece, and it is not unusual to get a growth of several feet from such cuttings.

Dr. M. M. Frisselle: Would you cut the lower part of the cutting off square or oblique?

Mr. Harris: Where we have to heel it in, we cut it off square. I do not believe in the use of shears for cutting the wood, because it crushes it. In pruning I use shears, because the vine is cut off above the bud, but in making cuttings you should use a knife.

Mr. Brackett: Do you heel in in the cellar or out doors?

Mr. Harris: Dig out a pit deep enough so it will take them in, put them in bud end up, so the top of the cuttings will be about six inches below the level of the ground. I take fine soil and put over the cuttings, and as the weather grows colder put on more soil to prevent freezing, and in the spring when we take them out the roots are sometimes started. Even the Delaware can be grown in that way with perfect success.

Mr. Sampson: I would like to have Prof. Green tell us how to propagate grapes.

Mr. Dartt: Don't you like my way?

Prof. Green: No, I don't. (Laughter.)

Mr. A. H. Brackett: I had a method suggested by Mr. Stubbs,—cut right through the eye.

Prof. Green: It is generally supposed that the cuttings will succeed better if cut at the eye.

Prof. N. E. Hansen: Some years ago, I was with a man in Iowa who planted out four millions of cuttings the year I was there. The way he does, he makes cuttings of about three eyes, about eight inches long for most kinds, and four eyes, if he can get them, eight to twelve inches long. Another point is not to use wire for tying, as it hurts the wood wherever it is touched by the wire. Tie with willow in bundles of 100, get the butts even and bury the cuttings about four inches, sifting fine earth over. Make your pit of such depth that when you put your earth over the cuttings they will be about four inches below the surface, then put manure over that. In the spring you have to watch it very close; if you leave it too long, the roots will be started before you know it, and when you take them out they will have started and the shoots will break off, and you will lose that much strength. You can take the manure off and make this four inches of earth mellow. As a general thing you will find that the cuttings have calloused sufficiently when ready to plant out. The proper time to plant is when the callos has formed at the root of the cuttings; you do not want to wait until the little fibres have started; if you do, you will lose most of them. Then you want to get the soil as fine as possible. The soil in Cass county is very mellow, but on other

soil you might not get it as mellow. They go along on their hands and knees and stick the cuttings in about three or four inches apart. There are stakes stuck on a line a quarter of a mile long, and each man has a certain amount of work to do. The cuttings are put in clear to the top bud, and the best of cultivation is given the entire season. They get a stand of seventy-five to eighty per cent., and fifty per cent. would be an average number of vines. If you are able to get the soil loose enough to push the bud down, it ought to be put in on a slant; and if you are not able to stick them in, why plant them with a dibble.

Mr. Elliot: Do you ever firm the ground around the cuttings?

Prof. Hansen: Just stick them in, and this loose, mellow earth will settle just as much as it should. By all means put the cuttings in that way, if you do have to put in extra work to get the soil mellow.

Mr. Brackett: Don't you put the cuttings in upside down in the fall?

Prof. Hansen: Oh, yes; the idea is not to get the buds started too soon.

Mr. Harris: Sometimes when the ground is ready and we are ready to put them out, they are not calloused enough. In such a case we take a hotbed sash and fix them over; we put a hotbed sash over them a week or ten days, which hastens the callousing. Where the ground is not mellow enough to stick the cuttings, we have a boy with us to hand them out and we use a broom handle to make holes for them. If the roots have really started, I open a ditch with the spade and put them in carefully, and they will not be very seriously injured.

QUESTION.

"What system of training grape vines will produce the best results for a long term of years?"

Mr. A. W. Latham: I do not know that I have had experience enough to answer that question. The best system of pruning is that which gives you the most fruit for a long time. Some varieties will fruit by close pruning, and others, like the Moores Early, require a long cane. You can keep the vine in much better shape with short-spur pruning, but where it is necessary to prune long in order to get fruit, you simply have to do that or go without fruit. Usually, the long pruning of a vine puts it into bad shape and makes it more difficult to lay down. All these things are to be considered. The first thing

to be considered in the process is to get fruit; if you do not get fruit the whole thing is a failure. By following up a system of summer pinching you can prune a great deal closer and thus keep your vines in nice shape to handle. On the Delaware it is not necessary to pinch so close, but on other varieties, like the Concord and Rogers, you must do a great deal of pinching. When the lateral has grown out three or four inches, you want to pinch it off; and when it starts you must break it off again, and in that way you get nice large bunches of fruit. If you are after monsters, you can follow Prof Green's advice and girdle.

Dr. Frisselle: I think the question asked considered the different methods of training.

Mr. Harris: My opinion is that the best system of training the grape for the farmer in Minnesota is the single arm and short spur; and I would plan to keep one spur close to the base and raise one cane from that every year, for after a while these spurs lose their vitality and fruitfulness, and by having a safety valve in the way of this branch at the base of the vine you never lose a full crop of fruit; you only lose a partial crop, and the rest it gets that year will recruit the vine so it will be good for many years longer.

Mr. Brackett: How many buds do you leave at the fall pruning?

Mr. Latham: Two or three. You cannot keep these spurs at regular distances; I try to keep them eight or ten inches apart. On the Concord and Rogers I leave one or two long canes on the vine.

Dr. Frisselle: I would like to say one word on this matter of grape culture. I have had a little experience with the Delaware vines, and I have heard nothing said today in regard to the distance apart the vines should be planted in the row. Mine are planted about eight feet apart in the row, and I believe that is too far apart. I think it would be better to plant more vines and to plant them nearer, because there is a tendency to leave a little piece of the vine entirely bare of buds, and you have fruit at one end or both ends and a space in the middle where there is no fruit at all. I think it would be well to plant the vines five feet apart, then you certainly will not have such a long piece of cane without any spurs bearing fruit. Plant five feet apart, and I think we would secure better results. If I was planting another Delaware vineyard I would plant the vines five feet apart.

Mr. Sampson: In regard to the space between the spurs on the vine, I think you will find if you leave three or four long spurs on the vine that a large part of the intermediate buds between these long spurs will be killed out the next season.

Dr. Frisselle: I do not quite agree with that statement. I have carefully pruned my vines for the last ten years, and I try to keep spurs the whole length of the vine. It is not because I leave any long canes that some of them are missing; I only leave two or three buds.

Mr. S. P. Jennison: In regard to the space between the spurs on the Delawares, I have had a little experience, but I do not know whether it is good for anything. When I had a little garden to plant I wanted a few grape vines. I did not know anything about cultivating grape vines then, and I have forgotten nothing since. The best book on grape culture recommended then was by A. S. Fuller. He said it was difficult, if the two arm system was adopted, to cover the vines—that went without saying. He recommended for climates where it was necessary to cover the vines to adopt a different system, a single arm trained to stand at an angle of 45° ; at a steeper angle the growth would be almost entirely at the end of the vine, and at a less one, or nearly horizontal, the growth would be near the turn in the vine. I did not know any better than to follow his method. I perfectly agree with the Doctor that five feet apart is enough for the Delawares, but for some varieties like the Rogers No. 5 and No. 3, where a man has to walk pretty fast to walk around the vine the way it is growing, five feet is too near. [Laughter.]

Plums and Cherries.

PLUMS AND CHERRIES.

JOS. WOOD, WINDOM, MINN.

The past season has been a fair one for plums. I have a good many varieties, but have not fruited all yet, and the trees that have fruited were small and under-sized. It was my fault in spraying the trees with a mixture of paris green, as strong as is made to kill potato bugs, to kill the web caterpillar; I did kill the caterpillar, plums, and almost the trees, too.

About cherries, I have little to say. I have about six varieties, but would not recommend any; they are not worth the place they grow on. The tree is hardy but does not fruit. I also have the Utha cherry and Dakota sand cherry; they are not productive enough to pay for the ground they grow on. I have been growing the Utha cherry for twelve years, and have not had more than a dozen cherries each year. This cherry is as large again as the Dakota sand cherry that I grow. I should strongly recommend the wild black timber cherry, not alone for the fruit, but also for the timber. The tree at my place grows as fast as the box elder, and it will bear fruit the fourth year from seed. A Mr. Knudson of Springfield tells me he has a kind of choke cherry that is almost as large as the tame cherry and hardly chokes any. I think such would be the kind to plant and to improve.

He also sent me some samples of plums, and I must say that one that he calls the Knudson's Peach was fine; it would peel like a peach, was good to eat from hand and A No. 1 canned. I also received a sample from Mr. H. J. Ludlow, of Worthington, of the Ocheeda plum, and I should call that one of the best to eat from the hand. Both Knudson's Peach and the Ocheeda I should recommend for general planting. In regard to the Russian plums, I know little. I have but two kinds, and they have not fruited yet, and are not hardy; and, also, with the tame blue it is the same. I have seen some of the fruit of the Russian at Mr. Martin Cook's; it was larger than our natives, but the quality was not so good, and they are not long-lived trees. I should not recommend them for general planting.

VARIETIES BEARING.

VARIETIES.	Date of blooming.	Date of Ripe Fruit.	Size.	Quality.	Hardiness	Productiveness.	Market value.
Cherry.....	May 18	Sept. 2	Very large	Fair	10	.....	10
Wood.....	May 20	Aug. 30	"	Fair	11	10	.....
Rollingstone	May 24	Sept. 10	Medium	Best	11	1	10
Wolf	May 24	Sept. 12	Large	Good	11	10	10
Forest Yard.....	May 24	Sept. 6	Medium	Good	11	10	7
Desota.....	May 28	Sept. 15	Medium	Very good	11	10	8
Weaver.....	May 28	Sept. 12	Medium	Fair	11	5	5
Blue Victor.....	May 28	Sept. 12	Small	Fair	11	5	.....
Speer	May 28	Not ripe	Small	Good for can.	11	8	2
Knudson's Peach..	May 24	Sept. 8	Medium	Very good	11	.....	10

PLUMS AND CHERRIES.

H. KNUDSON, SPRINGFIELD, MINN.

The past year has been a good fruit year and the conditions have in some way been favorable to the fruitfulness of the cultivated plums, *Prunus Americana*; and, although the blooming season was three weeks later than usual, the fruits ripened only a week later than usual. The first bloom seen was on May 19th, and by that time all danger from late spring frosts is generally past in this section; consequently, the cold weather did no injury to the blossoms whatever; but generally during the blossoming period the weather is very changeable. We had a good deal of hard winds and driving rains with intervals of a day or so of fine weather, the latter being just suitable for the trees at that stage. The May bugs, or rose beetles, again interfered some and became very numerous, putting in their destructive work among the trees, which the trees had to struggle against; but the trees had started in for a big crop and came out victorious. Fruit set well and matured the heaviest crop we ever had. Some of the latest bloomers opened their first blossom as late as May 29, or ten days later than the earliest, which ripened some of their fruits three months from blooming time.

Nearly all of the trees do well here and produce more or less fruit every year, even when no fruit is produced in other parts to the east of us. We even raised plums here in this section of southwestern Minnesota the previous year, which was a very unfavorable season for that kind of fruit in most places. This last year the weather during July and August was very dry and hot, ranging from 94 to 104 degrees Fah. in the shade every day; on this account, and also on account of the heavy loads of fruit the trees carried, and also the short season in which to grow and ripen their fruit, the fruit was not as large as usual. We have raised good crops of plums some years, when some of our plum trees in full bloom have been subjected to a frost of from eight to ten degrees Fah.

There has been said a good deal in favor of this race of plums, but none too much. Our plums, when once started, grow very fast and ripen their wood and fruit in a short time, and turn out large and beautiful colored fruits and of the best quality. They give us fruit early and late; and all the different flavors can be had from them which are generally to be found in other fruits, the peach, apricot, etc.; some are very firm in flesh, others, more juicy, some are perfect freestone varieties, others, clingstone. There are fine varieties among them, which sell well in our markets and bring good prices, and some of the varieties are very fine for jelly, canning, etc., for home use.

It was at one time believed, years ago, that we could not raise tree fruits in this section, but it occurs to me that the plums which have taken most of the premiums for the last few years exhibited at the Minneapolis Exposition and at our state and county fairs, have been grown here and there throughout the southwestern part of Minnesota. Mr. Dewain Cook, of Windom, carries off quite a number of premiums every year; he is successful in the raising of

this fruit as well as other kinds of fruit, and is raising more fruit than any other man in our section. Mr. Jos. Wood, of the same place, has also taken premiums on some of his fruits; also H. Knudson, of Springfield, H. J. Ludlow, of Worthington, and others. I believe at the present time we have more lovers and good workers favoring this fruit, and more interested in the cultivation of it than heretofore.

The experimental work at present, together with the work being done by growers and lovers of this fruit, is surely progressing. The plum is being cross-fertilized by some skillful hands with certain objects in view. Some are working for quality, color and form; others for size, firmness, etc.; others again trying to originate free-stone varieties, earliness, etc. It is believed that the time is not very distant when we shall have the best race of plums in the world. Some of these men engaged in the work are not disposed to give up until their work is accomplished, and they have no doubt the very best of material to work with in our native plum, *Prunus Americana*. It is not known that a race equal to it was ever found in any part of the old world.

What has been said of this plum is more that can be said of the European or the Russian plums. There are but few of these grown here. Chas. Luedloff of Carver is growing several of the varieties and has been meeting with some success in raising some of the fruit, and pronounces them good for eating and cooking. Some are of large size and bear fair to good crops in favorable years. Mr. A. Norby of Lake County, S. Dak., writes me that he has raised some very fine fruit from a Russian plum called Early Red, which is firm, meaty and of good quality, large and a good cooking plum. The nearest place here where any of the Russian plums are growing is at Windom, some by Jos. Wood and more by Dewain Cook. I have not seen the fruits of these, but Mr. Cook writes me that he has raised some of the fruit, which were of good size, also good in quality. Although the hardiness and productiveness of these trees are not considered by any of these parties growing them above-named to be assured, nor have the tree as yet been fully tested, some among them may be found that may do well with us.

Our cultivated plums brought from two to three dollars per bushel this last year, and at places even four dollars. The wild plums were not as plenty, although in places where not destroyed by caterpillars or rose beetles quite a crop could be gathered of the fruit. The best of these in some years sell at one dollar and a half per bushel. The cultivated plums so far are the most reliable to plant for a crop of fruit; experience has taught that with the right kind of treatment a crop is almost certain.

We aim to get trees that are in a healthy condition, and in planting them to set moderately deep and give plenty of room for the roots to grow in well-worked soil. Cover the roots with rich mellow earth and firm down well. I find that a heavy, coarse mulching on top of this mellow earth—*over the roots in their holes, instead of on top of the ground*—protects the roots in winter; and by filling the holes up loosely on top with earth the rain finds its way through into the mulch and is held there, so

that the roots always are supplied with moisture, which is very necessary to the production of a crop of fruit, especially in hot and dry seasons. This will last for six years or more. The trees are thus never exhausted but are better able to perform their work, as they always have some moisture in reserve to draw from and are not exerted or excited by sudden changes of the weather, but produce a steady and healthy growth. The roots are the main part of the tree, and as long as the soil contains plenty of the elements necessary to the development of the whole tree, together with plenty of moisture, it will give fruit every year.

I name a few of the varieties of my own growing for home use and for market: Harvest, Marble, Knudson's Peach, Homestead and City; these are all doing well. The first two named are early and the other two are medium early, of best quality for home use. The City is a seedling of my own, a little later in ripening, of large size, and is the only perfect freestone variety I have yet seen. I also have fruited on my place the Weaver, Luedlof's Red, Cheney and Rollingsstone, which are all good varieties. The Rollingsstone is a very fine variety; it has borne very little fruit with me so far, but is loaded with fruit buds and promises a heavy crop another season; perhaps it does better with age. The Cheney is large and very fine and bears every year here with me. Luedlof's Red, though not of as large size, is a beautiful red color and fine for eating out of hand, and is the best of any so far for jelly. My Peach and Homestead plums are superior to most of these for dessert, canning, etc.; the Cheney is a No. 1 cooking and canning plum; the City plum is a fine market variety, also fine for sauce, etc. In fact, all possess more or less merits. I fruited the Desota and the Hawkeye sparingly for the first time last year.

Jos. Wood of Cottonwood county sent me specimens of his seedling plum, called Wood plum, which originated with him. It is a very fine plum in color and texture; the flesh is firm and of a peachy flavor; the skin is easily removed from the flesh; the fruit is large, early; tree productive and an annual bearer. Another plum he called the Blue Victor, which he says is very good in quality when ripe, good for canning, etc., although somewhat small in size. These were not ripe enough to judge of their merits. Mr. D. Cook of same county sent me samples of the Speer plum, which he thinks a good deal of. The Wolf plums he sent me were the finest and largest of that variety I have ever seen. These gentlemen inform me that H. J. Ludlow, of Nobles county, grows very fine plums; a variety grown by him called Ocheeda, is one of the best, of high quality, with the flavor of the apricot, and the trees produce an abundance of the beautiful fruit.

Cherries.—Of cherries, I have growing on my place Early Richmond, Montgomery and two or three of the common European sorts, of the Morello type. We have raised some fruit from all of these more or less for several years past, but this last year the least of any, and the little fruit that set was small and poor in quality. The cherry bloom was scanty, and, consequently, we could not expect much fruit. Early in the spring the trees seemed to be well supplied with fruit buds, but by blossoming time most of these proved

to be leaf buds, and many of the blossom buds would drop from the tree by a touch of the finger; those that were left were apparently dry, and appeared to be hollow within. I examined them, but could at that time find no insects of any kind, but concluded that there must have been something of that kind working among these fruit buds that destroyed the life. I found this to be the same at L. Schmidt's place in the town of Mulligan, eight miles from Springfield, who has a seedling cherry orchard; the crop failed with him. Other years he has had moderate success with this fruit. Mr. Dewain Cook writes me that the cherry was a failure with him this year, but that he has been growing the trees and raised the fruit other years, and I presume the cause of this failure at his place could have been traced to this same minute insect early in the season. My grounds are small, with limited means, and it could hardly be expected from the few varieties I grow, or from the few varieties grown here in this section, to look for much information, or to look for the coming cherry that shall be best adapted to our climate. The cherry has as yet been planted by very few in this part of our state. Of the older sorts grown here I should place first on the list the Early Richmond and Montmorency. These varieties are early in blooming and ripen their fruit early in the season; the fruit is good and the trees bear a fair crop; the trees are fairly hardy the last few mild winters. The other cherries grown here bloom later, ripen late in July and first part of August, and need further trial. We have none of the Russian varieties, except what are grown by Mr. Wood and Mr. Cook of Windom. We must await reports from experimental stations, where more than two dozen varieties of the Russian cherries are on trial.

The sand cherries grown here are not of the productive varieties which are grown by parties elsewhere. They were received from Mr. J. S. Harris, and no doubt are the kinds found in the eastern part of this state. There seem to be three kinds among those he sent me; one is upright in growth, about five feet high, produces dark red, small fruit; another slim, upright; and another trailing. The fruit of these is jet black. The trailing variety produces the largest fruit. The bushes are full of bloom every spring, but little fruit is set. By some the sand cherry is claimed to be worthy of extended trial; others claim that budding them on the plum will enhance the fruitfulness. Seedlings raised from some of the best have shown some improvement and may yet prove to be of more value.

There are other cherries grown here; the bird or wild red cherry, which so far has only been grown for its beauty. It is a very fine tree when in bloom, and also when loaded with its fine red, shining fruit; the leaves are of a glossy green color, and it makes a fine ornamental tree. As yet no attempt to my knowledge has been made to improve this fruit. The tree is perfectly hardy to start with, which is one of the main points in this climate. Possibly, some crosses might be made with it and the other tame cherries producing the largest fruit; the bird cherry itself is very fruitful.

Another cherry is the wild black cherry, not grown in this vicinity, but I think it is native to some part of this county. Varieties of this have been found in some of the states farther east which pro-

duce quite large fruit. I have never seen any fruit of the large-fruited variety, but no doubt by cultivating it or by raising seedlings of it from selected seeds, a valuable fruit could be had. Then there is the choke cherry. This is very common and to be found all through the groves. The trees bear an amount of fruit every year, but were a failure this year, so that hardly one-half dozen of the fruit could be found on any one tree, while selected ones and seedlings from some under cultivation bore a full crop. These seem to bloom somewhat later than the tame cherry and the trees are thrifty, healthy and productive and free from the disease known as black knot. I think these to be what are described by some writers as *Prunus Demissa*, the Western choke cherry. The fruits of these are much larger and ripen their fruit earlier than the common ones, and the fruit is nearly free from the astringency which are so peculiar to that fruit. They are the best of that class of fruit I have ever seen. The trees of these bore a full crop the past season, while scarcely any fruit could be seen in the woods on the common sorts. One variety of these shows some distinction from others in the habit of growth, color of the bark, also some in bud but more so in the leaves. The fruit of some also differs in shape from others and is of a dark red color when ripe. I think that the fruit of these are too good for the name choke cherry, by which these are known, as these do not choke like the common sorts. As the word or name Morello has been given to some of our other tame cherries, we proposed the name "Corello" cherries for this class of fruit, and this in the honor of our daughter Corinna, who was present when the fruit was found. The fruit is well liked by some of our best judges of fruit, such as Harris, Heideman and others who have seen it; they all testify to its being the best of its class they ever saw or tasted, and consider it well worthy of extended trial.

NATIVE PLUMS.

O. M. LORD, MINNESOTA CITY.

A recent catalogue gives to this fruit, native plums, the first and most important place. "Because of its rapidly increasing importance as a profitable market fruit, and for the widespread interest in the production of improved varieties of our hardy and prolific native species, the compiler believes the result will well repay for special study and work in this direction; having full confidence that the best, carefully selected native plums will yield larger profits in the orchard than any other stone fruit now cultivated."

These statements coming from a large nursery of the Southern states, where all the finer varieties of the stone fruits are supposed to flourish, are entitled to our earnest consideration, especially, when applied to Minnesota, where it is impossible to grow the European varieties successfully for market. A glance at the sixty varieties advertised in the catalogue as belonging to the American group shows that thirty-five of them (no doubt among the best) are indigenous to the valley of the Mississippi, in Minnesota, Wisconsin and Iowa.

Are they adapted to cultivation? No wild fruit is more variable in character or more widely distributed; and, being indigenous when the right kinds are selected, it will succeed under cultivation in every habitable portion of this continent. As they grow naturally, the inferior kinds are no doubt the most abundant, but selections have been made that rival the Europeans in size, color, quality and productiveness of fruit, to say nothing of adaptability, hardiness, etc.

Varieties.—The species generally include the sand or beach plums of the Atlantic coast, the Chickasaw of the South and the Northern. The Northern is sometimes found as far south as Alabama and the Chickasaw as far north as Illinois. Each variety appears to be best adapted to its own latitude, though they mix freely in fruit, where planted near together. It is the purpose of this paper to consider more particularly the Northern plum. Late observations have thrown some light upon their peculiarities of bearing and non-bearing and habits of growth and the production of abortive fruit, or pods, instead of fruit.

Blossoms.—The time of blossoming varies with the season. Nearly all varieties when in bloom are extremely sensitive to cold or to wet weather; high winds will also effectually destroy the pollen. If frost, or wet and cold weather occur immediately after the fruit has set the result will be abortive plums or pods. It has been supposed that the production of plum pods was owing to a diseased condition of the trees; also, that it was the work of insects; but these are mistakes, the difficulty is entirely climatic. No well attested experiments have yet demonstrated that sound fruit can be inoculated by contact with the pods, therefore, it is not contagious, like the rot; nor can it be shown that the pods produce spores, like the black knot, to be transmitted through the atmosphere to become infectious. Destroying the pods will have no effect, as the mycelium which forms the pod is frequently found permeating the leaves and twigs of the new growth, whenever the fruit is affected. If any mycologist should succeed in cultivating the mycelium, he will need to disorganize the tissues of the tender fruit and leaves by excessive cold or wet before he can demonstrate any marked effects from its introduction. All varieties are liable to these conditions; that some are apparently more so than others is owing to the difference in time of setting fruit or to a more exposed location of tree. The opening of the blossoms is not materially dependent on the condition of the soil, as they will perform that office without any root connection; as when the ground is frozen, or when large limbs are severed from the trunk, which shows that blossoming cannot be retarded by mulching, as some have supposed. All varieties usually blossom before the leaves appear. A close study of the blossoms of the different varieties shows a marked difference in their structure, from which some observers conclude that the native plum trees are dioecious, at least functionally, if not in form and appearance. They are not distinctly so, like the strawberry, but all varieties sometimes produce more or less blossoms without pistils; and on some trees and even groups of trees none of the blossoms ever have pistils and, of course, bear no fruit. What is more peculiar, some trees will bear

fruit for a series of years, and then for a year, or perhaps more than one year, the blossoms will be without pistils. Harrison's Peach is known as a very shy bearer, though not deficient in pollen; ninety per cent. of the blossoms are usually without pistils, while with Rollingsstone, Desota and other regular bearers not more than one or two per cent. are so.

Another striking difference is in the form of the pistils. Some are short and stocky, others long and slim; some never reach beyond the anthers or pollen, and some protrude one-third or more of their length; whatever the shape, it is always uniform in that variety. All kinds are usually provided with sufficient pollen, and a very small portion is sufficient to perform its office, though it is much more abundant in some kinds than in others. Its vitality is, however, easily destroyed. The most reliable trees to bear are those having blossoms with short, stocky pistils and with small incurved petals. This form appears to be more exempt from the vicissitudes of the weather than those with long, slim pistils and broad open petals. Among other fruits it has been questioned whether the pollen has a secondary influence or modifies the fruit to any extent; the plum is so variable from season to season, that it is difficult to demonstrate a secondary influence, but it has been observed that where freestones and clingstones have been planted near together that both kinds of fruit have been found on both trees.

Non-bearing.—What has been said in regard to blossoms, incidentally covers some of the ground in regard to non-bearing, time of blossoming, structure and peculiarity of the blossom and habits of the tree. In some cases trees that have been known to bear well in their wild state, refuse to bear when transferred to cultivation. Mr. Weir was among the first to discover that one of the difficulties was want of pollenizing, and obviated it by planting different varieties near together, being careful to plant those that bloom at the same time closely together. This is found to be quite essential with some varieties, while others bear abundantly, whether isolated or in groups. The Miner when standing alone is not reliable, though considered an excellent pollenizer for other varieties, and is itself very susceptible of the pollen of others. The Desota does not appear to be dependent upon these conditions, but will bear fruit when among others or when standing alone. Cutting the tree closely for scions has a tendency to check the bearing for the following season, as the energy of the tree is then directed to making wood; but cutting off some of the large branches in the spring has the effect to promote the growth of both wood and fruit.

Propagation.—In a natural state the trees most usually reproduce themselves by suckers or sprouts from the roots. This tendency is increased under cultivation, if the roots are cut or broken. In such cases the young trees always produce fruit of the same kind and quality as the parent tree. But if trees are grown for seed, the fruit may vary widely from that of the parent in size, quality and appearance, unless the parent was entirely isolated at time of blossoming and not exposed to the influence of other pollen. Red

plums may be grown from the seed of the yellow, and yellow from seed of the red.

The natural habit of reproduction from the roots is a valuable quality of the plum tree; we are thus assured of maintaining the character of the fruit and hardiness of tree. Of course, the fruit can be multiplied indefinitely by budding and grafting, but the trees will not be as long-lived nor as abundant in bearing, even when worked on their own roots, and the fruit when grafted onto other stock will be more or less modified by it.

Some of the Chickasaws of the Mariana group are easily propagated from cuttings, but experiments with the Northern kinds have not been satisfactory. Some very fine results have been obtained by hybridizing the Japan plums with the Chickasaws, but both Japan and Chickasaws are too tender for this climate. Crosses of the Chickasaw and Northern, are in some cases said to be superior to either parent: the Hawkeye and the Miner are the best known types of this cross; but in crossing the Miner with the Northern, the fruit is not equal to either parent. Opinions differ in regard to the qualities of the Russian plums; some growers say they are superior to any of our natives, and others say they are all inferior to our best natives, from which it may be inferred that there is a great difference in taste, and, may be, error in judgment, and that both varieties are desirable for the purposes to which they are adapted. No natives have yet been found to correspond with the commercial prune. Leaving this out, no well informed lover of good fruit has been heard to criticise severely the Rollingsstone, the Cheney, the Desota or the Gaylord plums, as compared with the Europeans. These varieties have been well tested and are well known, and are in every way desirable for those who would plant for the enjoyment of fruit of large size, delicious quality, fine appearance and abundant yield. There may be many others, quite as desirable, but they are not generally known and are difficult to obtain. These varieties when transplanted, as suckers, or when grafted into older stock, will usually bear at three years of age; when grafted into the twigs of trees, they will frequently bear the second year.

There seems to be more difficulty in grafting plums as nursery stock, than with apples. This is generally attributed to the scions, as, if they are kept a little too moist, they become calloused and entirely worthless; if kept too dry, they shrivel and are lifeless. The stocks do not appear to be so affected; and if the scions are cut before the buds swell in the spring and immediately used, nearly all will grow; but so much difficulty has been met with that some of the large nurseries have abandoned grafting and have resorted to budding with more satisfaction.

PLUMS A NEGLECTED FRUIT.

READ BY CLARENCE WEDGE, OF ALBERT LEA, AT THE LATE MEETING
OF THE S. MINN. HORT. SOCIETY.

It is a fault common to all mankind to overlook the blessings and comforts with which they are surrounded, the treasures that lie at their feet, and sigh for the halcyon days of the past, for the good fortune of their neighbors—for the gold hid away in the distant mountains; a most unprofitable trait of human character it is to those engaged in any calling or pursuit, and one we are free to say has been and is today a most conspicuous enemy to our progress in all horticultural lines. How often do we hear some owner of a fine suburban lot, or a broad-acred farmer lament: "If we could only raise fruit as they do in the East"—when a look into their gardens would show their currant bushes producing fruit the size of bird shot, when a very little intelligent care, as much as they in the East have to bestow in order to conquer the currant worm, would insure them fine appetizing berries the size of field peas. The gooseberry, a rich, fine flavored fruit, as hardy as the hazel, might be either missing altogether, or in a forsaken grass-grown corner visited only to pick the berries, that nature, after a single handed struggle, had been able to produce. We might look in vain for the noble strawberry, finer flavored with us than elsewhere in the world, or for the dainty raspberry that, with a little checking and pruning of its luxuriant nature, will devote itself so generously to fruit. So, few or none of these overflows of nature's bounty to our Minnesota soil are to be found; and if in wonder we inquire the reason, we shall but provoke the groan: "If we could only raise apples as we did in York state!" Remembering the last barrel of York state apples that we ate, we venture to guess the secret of the poor soul's feelings. Is it the worms he longs for? Our Minnesota apples don't harbor worms, you know. Or is it the lack of scabs on our beautiful Duchess that make him feel lonesome? Or perhaps he remembers that in dear old York state his Northern Spys brought their first apples twenty years after planting, and has been sorely disappointed in his Minnesota orchard to find his Wealthys bringing a big crop six years after planting. Some people are so hard to suit, you know. "But peaches, we can never raise peaches in Minnesota!" Well, sad fate, perhaps not; and there's bananas and cocoanuts, and alligators, and yellow fever and poor houses, none of which seem to endure our terrible climate.

But now, in all sober earnest, we would ask every fruit hungry Minnesotian: Have we a right to complain of what we can't have, when we are not enjoying in plenty what we may have? If there is a fruit that we can have, that grows as spontaneously as the currant, is as hardy as the wild grape, bears more regularly than the Duchess apple, and yet is not found in abundance in one garden in fifty in our state, is it not high time that we stopped our sour complaints and set out to know and enjoy the best that is about us?

The fruit to which we refer, and which, without flattery, possesses all the virtues we have above mentioned, is the improved native plum. It is no novelty. Here and there, scattered over our state,

are those who have been enjoying this fruit for many years, and we feel sure that they will all bear us out in the assertions we have made.

There are now many varieties, but the one that has made the reputation for reliability that the Duchess has among apples, is the Desota. It is about two weeks later in ripening than the average wild plum, and is a full size larger than the very largest wild plum the writer has ever seen. But, perhaps, the most remarkable improvement over the wild plum is in the peculiar peach-like flavor and meatiness of its flesh. The wild plum, when ripe, is usually but a bag of juice, and almost impossible to get to market in good condition, while the Desota is so firm that one of the common uses made of it in the family of the writer is to pare raw and eat with cream and sugar; and there is no doubt that it might easily be marketed in any of the nearer cities. In its habit of regular and full bearing it is also a great advance upon the wild plum.

Although a tree that will endure great hardships, it will not give full satisfaction without rational treatment. We decidedly prefer small trees for planting, and, if convenient, a north exposure or slope. The ideal method of setting for a large orchard is in double rows running north and south; that is, we should plant two rows ten feet apart and trees ten feet apart in the row, and, then, about thirty feet from these rows plant two more rows like the first, and so on. The thirty feet strip between the thickly planted rows gives enough circulation of air and may be put into garden crops and potatoes. The double rows should receive cultivation or a heavy mulch, and raspberries might with advantage be raised among them for several years. All root sprouts should be rigidly kept down, as, of course, all grass and weeds. Branch the trees at about two and one-half feet from the ground; beyond this do not be tempted to do any trimming; except the shortening in of branches that may grow too rank and top heavy for the stem, as all stone fruits in our climate seem to do better if grown with thick, bushy heads.

There are several other good varieties besides the Desota. The Forest Garden is fully as large a fruit and two weeks earlier in ripening, but it is quite soft and watery, and the tree very liable to split down in the crotches; it is well worth planting and is commonly found in the nurseries. The Cheney, Wolf, Rollingsstone and Rockford are all good sorts, not quite as generally tried.

We may seem to have drawn a rather rosy picture of plum growing in Minnesota, but propose to mislead no one, and will here give the benefit of all the drawbacks and difficulties that have come to the knowledge of the writer. The Desota does not stand extreme drouth as well as could be wished. In such seasons, the fruit will be much smaller than usual, and its quality will also be impaired. For the same reason, it is not the best variety to plant in sandy soils. We think the Rockford will be better to plant in soils badly affected by drouth. Some varieties, especially the Desota, are inclined to set too much fruit, more than they can properly mature. Three years ago our trees seemed to have more fruit than leaves on their branches, and as a result the fruit was small and ill-flavored,

several of the trees were nearly killed by the great strain on their vitality, and all prospects of a crop the following season destroyed. We thus really lost two crops. The only remedy for this trouble is in careful thinning of the fruit when it is the size of small hazel nuts. Do not be afraid to do thorough work. It will take time, but save you two crops and, perhaps, the life of the trees. One of the most serious drawbacks to plum growing has been improper grafting in the nurseries, and sending out trees that have sprouted from below the graft, the graft having, perhaps, failed; very many have failed for this reason. The remedy for this is to do your own grafting. Every one should learn the easy and interesting art of grafting, or deal directly with careful nurserymen and insist that the trees be grafted on native stock, or, better yet, on their own roots. Do not be dissatisfied if your trees do not live forever; the plum is a tree that reaches maturity and profitable fruit-bearing age very quickly, and follows the old proverb: "Early ripe, early rot."

We do not wish any to gather from this paper that there is great excellence or profit to be achieved in any line of fruit growing without labor, thought and some disappointment, for there certainly is not, whether in Minnesota, New York or California. But we are earnestly of the opinion that the same effort that brings success and profit to the planters of California will today bring a liberal reward to the planters of Minnesota.

DELEGATE'S REPORT OF ANNUAL MEETING OF THE WISCONSIN STATE HORTICULTURAL SOCIETY.

Held at Madison, Wis., February 6, 7 and 8, 1894.

BY R. C. KEEL, ROCHESTER, MINN.

Before making my report I wish to thank the officers and members of the Minnesota State Horticultural Society for the honor they bestowed upon me in selecting me as a delegate to Wisconsin. It was indeed a trip of pleasure never to be forgotten and will always remain fresh in my memory.

I reached Madison at 4 a. m., and went to hotel Schulkamp, the headquarters of the society, where I found first class accommodations and courteous treatment. After breakfast, I went to the horticultural room in the State Capitol, and enjoyed the pleasure of renewing my acquaintance with the leaders of our good work, viz: Pres. M. A. Thayer, Messrs. A. J. Phillips, A. A. Parson, A. G. Tuttle, and others.

Soon after the convention was called to order by Pres. Thayer, your humble servant and Mr. Henry A. Ash, from West Union, Iowa, were elected honorary members for 1894 and invited to take part in all the discussions, and were also presented with fine silk ribbons.

A large part of the morning session was taken up in hearing reports of committees on observation and on experiments at the trial stations; there are now three of these stations in the state. They are supported by the society, the expense for the past year averag-

ing about \$75 each. An urgent application from Winnebago county was read asking for a station, and was referred to the committee on trial stations.

A communication was reported from the Missouri society asking co-operation in a movement for the issue of a handbook on horticulture, to be used as a text book in public schools. The matter was referred to a committee.

All the afternoon session was devoted to apples, and a paper was read by Secy. B. S. Hoxie, of Edgerton, superintendent of the Wisconsin state fruit exhibit at the World's Fair. He gave a list of all the leading varieties of apples, and stated that he was very proud in looking over the fruit from the different states to find that some of the leading varieties were seedlings of Wisconsin; for instance, Wolf River, McMahon, Walbridge, N. W. Greening, Newell and others.

S. J. Freeborn of Richland Center, A. J. Phillips of West Salem, J. C. Plumb of Milton and A. L. Hatch of Ithaca read interesting papers on apples and the cultivation of the same. Mr. Tuttle of Baraboo spoke in favor of the Russian apples and recommended the Hibernial, Longfield, Enormous and Beautiful Arcade, and said that the Longfield would stand more abuse and neglect than any other apple tree. He also said that the Wealthy was the only American apple tree that he would plant.

The evening session was occupied by reading papers. One by Prof. C. W. Smith was entitled "State Interest in Horticulture and the Public Schools." "Not Pretty, but Practical," was read by Mrs. Velma E. Melville, of Sun Prairie; "A Home," by Prof. J. C. Coleman; and "The Mission of Flowers," by Miss L. N. Strong, of Baraboo. All of these papers were very interesting.

Wednesday morning was devoted to election of officers. It was necessary to take five ballots to secure an election of president. The choice fell on L. G. Kellogg, of Ripon. Charles Hershinger of Baraboo, was re-elected vice-president. Mr. A. J. Phillips of West Salem, was elected secretary. Mrs. Vie H. Campbell of Evansville, was re-elected, but declined to accept the position as treasurer and reporter, and R. J. Coe, of Ft. Atkinson, was elected as treasurer. Mr. J. L. Herbst, of Sparta, was elected corresponding secretary.

The annual address of Pres. M. A. Thayer was the first on the program for the afternoon session. Among other things he said that the purpose of the convention is to collect and receive information so sure and accurate that all may follow with a reasonable assurance of success, and he said that the report of the society was eagerly sought for and found place in many fine private libraries.

The danger to fruit growing, Mr. Thayer said, comes not from over-production, but rather from selection of varieties unsuited to our climate and soils and from careless handling. He urged the members of the society to lead on and others would follow. Mr. Thayer further said, that the best apple is yet to be found, and Wisconsin should and "I am sure will produce it, as she has already produced other fruits."

The treasurer made her report, showing receipts during the year, \$1,725.38, and disbursements, \$1,224.01, and a balance in her hands of \$501.37.

George J. Kellogg, of Janesville, read a paper on strawberries and presented a list of 86 varieties, and gave his opinion as to the best. Among others he named Parker Earle, Enhance, Gandy, Smith, Bederwood, Warfield and Crescent, and for heavy clay soil Crawford and Eureka.

A paper entitled "One Year's Experience with Small Fruits," was read by J. L. Herbst, of Sparta. He said that Mr. Van Deman did better with him than any other. He recommended the Nemaha black-cap as being the best raspberry for shipping; the Cuthbert and Marlboro for red raspberries, and Ancient Briton for a blackberry.

Mr. Stickney spoke of currants, that being the only fruit he was cultivating for market. He recommended Prince Albert and Long Bunch Holland. From four acres planted with currents 5x5 feet, Mr. Stickney has received in four years between \$2,600 to \$2,700. He recommended severe pruning, leaving only the largest and strongest growth.

Wednesday evening, Mr. G. B. Smith, of Green Bay, gave one of the best papers I have ever heard on market gardening. The discussion brought out that sometimes (very seldom) manures are used to excess for garden vegetables.

Prof. W. A. Henry was called for and spoke of the location and surroundings, and of the duty of fruit growers and gardeners to furnish the great cities with fruit and vegetables.

On Thursday morning the committee on fruit list made their report, and the following list was adopted: Apples: Duchess, Hiberna, Longfield, Wealthy, McMahon, N. W. Greening, Newell, Yellow Transparent and Switzer; for trial, Avista and Patten's Greening. Crab apples: Transcendent, Hyslop and Virginia.

Strawberries. For shipping: Warfield, Bederwood, Crescent, Enhance, Parker Earle and Van Deman; for home use and near market: Crescent, Bederwood, Jessie, Bubach, Haverland and others.

Grapes: Moore's Early, Worden, Concord, Delaware, Brighton and Moore's Diamond.

Black raspberries: Ohio, Nemaha, Gregg and Older. Red raspberries: Cuthbert, Brandywine, Marlboro and Shaffer's Colossal.

Blackberries: Ancient Briton, Snyder and Stone's Hardy.

The superintendent of the Wisconsin exhibit at the World's Fair made his report, thanking the members of the society for their aid. About sixty-five varieties of apples were exhibited and about fifty varieties of grapes.

Mr. Wade Hewett, of Waupun, read a paper on trimming nursery trees.

By invitation from Prof. Henry and Prof. Goff to visit the state university, we met at the Capitol at 1:30 p. m. and were conveyed to the university by way of carriages. We first went to the horticultural building, where Prof. Goff spoke regarding the building and his work and what his students were doing. We also visited all the other buildings belonging to the university. It was a visit never to be forgotten.

The evening session was occupied by Prof. Goff, who made his report on trial stations, and also made some remarks about localities and treatment of soil for raising apples.

Mr. Wakefield, of Fremont, also read a paper, "Will it Pay?" He said among other things that he would keep on planting apple trees, even if he never got any of the fruit; for, said he, while my neighbors' boys are eating my apples, they are kept out of the saloons and gambling houses.

A vote of thanks was tendered the ex-president, Mr. M. A. Thayer, and the ex-secretary, Mr. S. B. Hoxie, for the interest they have taken and the work they had done during their terms of office.

The exhibit of apples, although not large, was very fine. The following varieties were exhibited by A. A. Parson: Eureka, N. W. Greening—five apples weighing three pounds fifteen ounces—Walbridge, Perry Russet, Willow Twig, Golden Russet, Fameuse and a fine seedling, which the committee named Rushford.

A. J. Philips exhibited Avista and several other varieties. A. S. Hatch showed Fameuse, Haas, Fall Spitzenberg, Winter Streak, Newell, Walbridge, Hallas, Pewaukee, Longfield, Ben Davis, Talman Sweet and Plumb Cider. William Springer "father of the N. W. Greening" exhibited Wolf River, Pewaukee, Alden, Helen, May, McMahon and Walbridge. Charles Hirschinger of Baraboo, Fameuse, Wealthy, Perry Russet, Talman Sweet, Pewaukee, Willow Twig and Seek-no-further. A. D. Barnes exhibited nine varieties of potatoes. Messrs. L. L. Olds and Purdy & Reed also exhibited fine collections of potatoes.

The premiums were awarded as follows: Largest and best collection, Charles Hirschinger, first, A. L. Hatch, second; best four varieties for quality, hardiness and productiveness, A. L. Hatch, first, Charles Hirschinger, second. The premiums on plates were about equally divided between Parson, Hirschinger and Hatch. Best display of potatoes, L. L. Olds, first, Purdy & Reed, second.

The superintendent of the Wisconsin fruit exhibit at Chicago also exhibited a collection of apples from different states. The Bellflower was shown from Oregon, Arkansas, Maine, New York, Iowa, California and Ontario. Ben Davis were there from Oregon, Iowa, California, Ontario, Missouri and Nebraska. In all cases the Arkansas fruit was the largest, but no difference could be seen as to the keeping quality.

All sessions of the society were well attended, about eighty votes being cast at the election; but the evening sessions were best attended, a great many young men, mostly students from the University, being present and took a great deal of interest in the work.

And now, Mr. President and members of Minnesota State Horticultural Society, I once more express my thanks for the confidence shown me; and I also wish to thank the officers and members of the Wisconsin State Horticultural Society for the courtesy and hospitality they extended to me during my stay in their beautiful city.

WHY NOT GROW SQUASH?—E. M. Chandler, left Minneapolis Saturday with three car loads of squash for Boston. Squash is worth \$40 a ton in this market and \$50 in Boston. When taken care of the yield is two to four tons an acre.—*Tribune*.

HORTICULTURAL CLUBS.

PLAN FOR THE ORGANIZATION OF CLUBS FOR THE DISCUSSION OF HORTICULTURAL TOPICS.

(Suggested by the Minnesota State Horticultural Society.)

1. **Who can become members?** Ans. Any one, young or old.
2. **How many are necessary?** Ans. Three or more.
3. **How often are meetings to be held?** Ans. Once every week from November 1st to April 1st, and occasionally during the balance of the year.
4. **What text books are necessary?** Ans. "The Minnesota Horticulturist," a magazine published monthly by the Minnesota State Horticultural Society, and the back bound reports of the same society.
5. **How may they be obtained?** Ans. By sending one dollar to the secretary of the society, A. W. Latham, 207 Kasota Block, Minneapolis, Minn., any one may become a subscriber to the monthly magazine (including membership for the year in the Minnesota State Horticultural Society, and all the privileges of the society).

Besides this, *new members*, if they apply at the time of subscribing, are entitled to receive postpaid a copy of the report of the society for 1893, 414 pages (cloth bound, while they last), and six horticultural premiums worth 25 cents each. (For list of premiums, see second page of the cover of this number).

6. **How may the back reports of the society referred to in question 4 be obtained?** Ans. Five volumes of the back reports (from 200 to 400 pages each)—being the ones referred to in the "*topic outlines*"—will be sent by express to any *Horticultural Club* sending five subscription fees for 1894. These will be found invaluable for reference and study and reading aloud at the meetings.

SUGGESTIONS TO ONE GETTING UP A CLUB.

Send word to all you can to meet you some evening, either at a private residence or at the school house; if there are only a few, a residence will be better. In order that the first meeting may be a success, ask some one to prepare an essay on the first topic for discussion, strawberries. After that is read, you will ask questions upon that subject and bring out discussion on the same. Appoint any one that is best qualified to write on the topic appointed for the next meeting, etc. (See by-law 1). Encourage the fullest discussion of every point.

PLEDGE FOR THE FORMATION OF A HORTICULTURAL CLUB.

We, the undersigned, do hereby form ourselves into a Horticultural Club for the study of subjects pertaining to horticulture, and we pledge each other that we will be present, if possible, at every meeting of the club and participate in its exercises and do all we can to promote its interests.

Signatures.

CONSTITUTION.

Article 1. The name of this club shall be the..... Horticultural Club.

Article 2. Its officers shall consist of a president and secretary (who shall also act as treasurer) and their duties shall be such as usually devolve on such officers.

Article 3. The membership fee shall be.....annually.

Article 4. This club shall meet everyweek..at such time and place as may be agreed upon or appointed by the president.

Article 5. The subjects to be considered at these meetings shall be strictly horticultural, including in their range the various topics treated in the reports of the Minnesota State Horticultural Society.

Article 6. This constitution may be amended at any regular meeting by a two-thirds vote of the members present.

BY-LAWS.

1. The president shall prepare beforehand a program for each meeting, appointing some one to write a paper on the subject for discussion and others to read extracts from the Minnesota Horticultural reports or other similar works, and also assign to different members to answer one or more of the questions found in the topic outline supplied by the Minnesota State Horticultural Society.

2. Reports of this club shall be made to A. W. Latham, secretary of the Minnesota State Horticultural Society, 207 Kasota Block, Minneapolis, Minn., as follows:

1st. At the time of the organization of the club, giving name of club and address of officers.

2nd. At the close of the series of meetings for the season, giving the following information, viz:

1. How many meetings have been held?
2. How many members have joined the club?
3. How many members from the club have joined the Minnesota State Horticultural Society during this year?
4. What topics have been discussed?
5. What topics were the most interesting?
6. Would this club like a series of topics prepared for next winter?
7. Whom can the secretary address on the subject?

TOPICS FOR DISCUSSION.

First Meeting—Topic—Strawberries.

Essay by.....

1. How should ground be prepared for planting?

2. When is the best time to plant?

3. How should they be planted?

4. How should they be cultivated?

5. If they have done well, how will they appear in the fall?

6. How should they be protected in the winter?

7. When should they be uncovered and how treated the second year?

8. What are staminate plants?

9. What are pistillate plants?

10. How should they be planted to secure a crop?

11. Name two of the best staminate varieties and two of the pistillate.

FOR READINGS UNDER THIS TOPIC SEE

Page 42Horticultural Rep't of 1881

Pages 18, 48..... " " 1882

Page 84... " " 1883

Pages 345, 375, 433 " " 1885

Pages 303, 306... " " 1892

Pages 338, 342.... " " 1893

Second Meeting—Topic—The Vegetable Garden.

Essay by

1. What preparation of soil is necessary?
2. Which is best, to plant vegetables in beds, or in rows so as to be cultivated by horse?
3. What vegetables ought to be found in every garden?
4. How is the best way to get tomato and cabbage plants?
5. When is the best time for setting?
6. How to start an asparagus bed?
7. After an asparagus bed is started, what care is necessary to keep it in good condition, and how long will a bed last?
8. How often should lettuce, radishes, peas and beans be planted to have them fresh during the summer?
9. What vegetables make the finest "greens."
10. Name the best early and late tomato
11. Name the best early and late cabbage.
12. Name the best varieties of vegetables for winter.

FOR READINGS UNDER THIS TOPIC SEE

Pages 112, 192....	Horticultural Rep't of 1883	
Page 247	"	1885
Page 318.....	"	1892
Page 361.....	"	1893

Third Meeting—Topic—Raspberries and Blackberries.

Essay by

1. How far apart should they be planted?
2. When is the best time for planting, in the fall or early spring?
3. How often should they be cultivated?
4. What are the advantages of pinching back, and when should it be done?
5. What is the best method of supporting vines?
6. How should they be protected in the winter?
7. Name two best varieties of raspberries.
8. Name two best varieties of black raspberries.
9. Name two best varieties of blackberries.
10. What is the best way of putting up fruit? Ans. See Page 387 in Report of 1893.

FOR READINGS UNDER THIS TOPIC SEE

Pages 393, 237....	Horticultural Rep't of 1885	
Pages 295, 299, 304	"	1892
Page 343.....	"	1893

Fourth Meeting—Topic—Grapes.

Essay by

1. How should the soil be prepared?
2. How far apart should they be planted?
3. What cultivation is required?
4. How should the vines be pruned?
5. How should vines be protected in winter?
6. What varieties are best to plant?

Ans. See Page 29, Report of 1893.
FOR READINGS UNDER THIS TOPIC SEE
 Pages 50, 57.... Horticultural Rep't of 1881
 Page 85..... " " 1882

Fifth Meeting—Topic—Currants and Gooseberries.

Essay by

Questions for discussion:

1. What kind of soil is best adapted?
2. How far apart should they be planted?
3. What cultivation is required?
4. How should they be trimmed?
5. Is winter protection desirable?
6. What varieties are the best to grow?
7. What are the best fertilizers to use?
8. What remedy will effectually destroy the currant worm, and how shall it be applied?

FOR READINGS UNDER THIS TOPIC SEE:
 Page 399. Horticultural Rep't of 1885
 Page 29..... " " 1893

Sixth Meeting—Topic—Ornamental Shrubs and Herbaceous Plants.

Essay by

Questions for discussion:

1. Can shrubs and flowering plants be grown successfully around the home?
2. Where is the best place to plant them?
3. Why should they have a bright sunny place away from trees?
4. Enumerate shrubs known to be perfectly hardy and that will keep up a succession of bloom through the summer?
5. What are herbaceous plants?
6. Name two dozen varieties that are perfectly hardy and that require no care after setting, except to keep them free from grass and weeds.
7. What varieties of climbing vines are the best to plant that are perfectly hardy?
8. What varieties of roses can be grown to advantage?
9. What protection is best in the winter?

FOR READINGS UNDER THIS TOPIC SEE:
 Page 66, 108.... Horticultural Rep't of 1881
 Page 26..... " " 1882
 Page 25..... " " 1883
 Page 426..... " " 1885
 Page 208, 212, 217, 350 " " 1892
 Page 373 " " 1893

Seventh Meeting—Topic—Fruit Trees.

Essay by.....

Questions for discussion:

1. What is the best location for an orchard?
2. When is the best time to plant?
3. How should trees be set; distance apart, manner of planting, etc?
4. Should the orchard be cultivated?
5. How can the trees be protected in winter?
6. Is mulching desirable, and when and how should it be applied?
7. Is it necessary to prune, and when is the best time?
8. What varieties of apples are the best to plant?
9. What varieties of plums are the best to plant?

FOR READINGS UNDER THIS TOPIC SEE:

Page 79, 118.....	Horticult'l Rep't of 1882
Page 98, 124, 211....	" " 1883
Page 173, 267.....	" " 1885
Page 256.....	" " 1892
Page 262.....	" " 1893

Eighth Meeting—Topic—Shade and Ornamental Trees and Evergreens.

Essay by.....

Questions for discussion:

1. What are the five best varieties of shade trees?
2. What are the five best varieties of ornamental trees?
3. Can shade and ornamental trees be planted in the fall as well as in the spring?
4. What varieties of evergreens are the best to plant?
5. When is the best time for planting evergreens?
6. What varieties of evergreens are the best for ornamental hedges?
7. What varieties of evergreens are the best for windbreaks?
8. Why is mulching necessary to the success of raising evergreens?

FOR READINGS UNDER THIS TOPIC SEE

Page 77	Horticult'l Rep't of 1882
Page 78, 327.....	" " 1883
Page 200, 197.....	" " 1892
Page 174, 172.....	" " 1893

THE GOOSEBERRY.—The market is very rarely over-supplied with this fruit, and a reason for this is that it can be gathered and marketed through a long season, instead of all having to be harvested and sold at one time. The green berries sell readily almost as soon as they are large enough to be picked, and bring then the best prices of the season, but this is equalized by the fact that later on they are much larger and a bush will yield more quarts. A gooseberry bush, at two years from the time of planting, should yield three quarts of fruit, and after that five quarts a season. An average retail price is about ten cents a quart. The crop is almost a certain one, for if the worms are kept off, which may be easily done by the use of hellebore, the only other enemy which they have to fear is mildew. Our native varieties are not much subject to that.

The plants should be set in cool, moist soil, and a partial shade does not injure them. Close pruning will increase their productiveness and tend toward making them longer lived. The fruit is the earliest we may have from our home gardens, and, if for this reason only, should be more widely grown than it is. In planting we advise procuring one year plants in preference to those older. Give good cultivation, a regular manuring in the fall and a cool mulch in the summer to protect the roots, and we think you will have no cause to complain of the profit which a small patch of the fruit will give you.—*Western Plowman*.

SOCIETY LETTER HEAD.

This page shows the front of a letter-head which has been prepared for the use of our members. On the back of the letter-head is to be printed the matter contained in the folder prepared to set forth the work of the society. It will be printed on a good grade of commercial note writing paper, properly ruled and furnished in tablets of 100 sheets at 30 cts., postpaid.

Each tablet will have as a cover a sheet of blotting paper containing a calendar for 1894.

This will be found a very convenient arrangement, and it is hoped many will use this means of advertising the society.

Address the Secretary,

A. W. LATHAM,

207 Kasota Block, Minneapolis, Minn.

Minnesota State Horticultural Society.

LIBRARY AND SECRETARY'S OFFICE,

207 KASOTA BLOCK,

(Cor. Fourth St. and Hennepin Ave.),

MINNEAPOLIS, MINN.

PRESIDENT,

J. M. UNDERWOOD, Lake City.

SECRETARY,

1894 A. W. LATHAM, Minneapolis.

PUBLISHES A MONTHLY MAGAZINE, ENTITLED,

“THE MINNESOTA HORTICULTURIST.”

SUBSCRIPTION, \$1.00 PER ANNUM, INCLUDING MEMBERSHIP.

(For full particulars see reverse page.)



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Secretary's Corner.

Eighty-seven additional names have been placed on our membership roll since the first of February.

The American Pomological Society is to hold its next annual meeting at San Francisco during next winter—the exact date yet to be determined.

Take special notice of the offer of writing paper on opposite page. The stationery is good, as well as cheap, and will, in its use, be of material aid to the society.

The horticultural portion of the state fair premium list is being revised with the purpose of drawing out a full display of the fruits, vegetables and flowers of our state. Copies of the new list will be sent to each member of the society in due season.

Please notice that another group has been added to our list of premiums through the kindness of Mr. S. D. Richardson, making six premiums to which each new member is entitled, besides the report of 1893. Here is a chance to get hardy nursery stock and a whole library, to tell you how to take care of it. If the members can spare time to tell this to their neighbors, we can easily double our membership list, and NOW is the time to do it!

Preparatory work is being done in connection with the rose festival which our society are hoping to be able to hold in the city of Minneapolis at the time of the next summer meeting, in the month of June. A premium list, subject to revision, has been prepared and sent to the florists and some others who it is thought might participate, asking for suggestions and co-operation. Should the season be favorable, it is hoped to make this event a success financially for the benefit of a building fund for the society.

Notwithstanding the protests of a few of our busy members, who can scarcely spare the time to cut the leaves, the magazine is still being issued uncut, for the reason that many will doubtless wish to have them bound at the close of the year, which cannot well be done if they are cut by machinery at this time.

You have noticed that a very much higher grade of paper is being used than for our ordinary report. Only 1,000 copies are being printed on this paper, and it is hoped that our subscription list will eventually require the whole number. The balance of the edition, 2,500 copies, will be printed on book paper as usual and bound for distribution. The magazine carries better uncut, also.

What do you say? Shall we cut it?

NOTE.—The twelve magazines issued in 1894 will be bound in cloth as the Annual Report of the Society and be ready for distribution at the beginning of the next year.—SECRETARY.

Please note the interesting report from Mr. R. C. Keel, of the meeting of the Wisconsin Horticultural Society. One advantage of this form of publishing the report is strongly emphasized herein, in that you get this matter "fresh" The interest one has in "news" is largely of *to-day*. The notices of Messrs. Harris and Dartt are other instances of the convenience of this publication.

The library and secretary's office is to be moved March 1st to a very convenient room on the second floor of the Kasota block, corner of Fourth street and Hennepin avenue. It is a front room overlooking the private park of "Elder" Stewart, and a very appropriate place for the office of the Horticultural Society. The regular office hours of the secretary will be from 9 to 12 a. m., Tuesdays, Thursdays and Saturdays. But callers are liable to find the door ajar at any time, as the work of the society is at present taking the whole time of the secretary. Call and sit in our easy chair, look at our park and the latest additions to the library. You are more than welcome.

The secretary's office has been a very busy place the last month. Besides the work connected with the launching of the HORTICULTURIST, securing and placing of advertisements, etc., circulars have been prepared and sent out to the school district clerks of the state, numbering about 6,000. These circular letters contain four different articles: The horticultural club circular, a copy of which is printed in this issue; a folder containing concisely the facts as to our society and its work; a third circular which is simply the first and second pages of the cover of the magazine; and, lastly, a return envelope. In this way every neighborhood, near and remote in the state, has been reached in our work. Some of this seed may fall on stony ground, but let us hope that much good may eventually come of it.

Propagation and Care of Rose Geraniums.—In propagating soft wooded plants, cuttings should be carefully taken so as not to injure the parent plant. With a sharp knife cut the terminal shoots just at the base of a leaf, and remove the leaf close to the stem. The cuttings will then root freely in clean sand, which is much better to use than soil. Pot off as soon as the roots are half an inch long, using thumb pots. Plants grown for their foliage should never be allowed to flower, as they then become weedy in appearance. In the house, geraniums are apt to grow spindling; to prevent this keep them well cut back when they show flowering buds, thus making stocky plants.—*American Agriculturist*.

Your Corner.

(Here is a chance for you to talk back, briefly and concisely.)

WHAT YOU SAY OF THE MAGAZINE.

"I am pleased with the change."—M. Crawford.

"You have struck the right idea with the monthly."—Chas. Dawson.

"I am thoroughly pleased with the magazine. The cover is in *good taste*."—Clarence Wedge.

"It is very creditable and works a step in advance."—L. Woolverton, Secy. Ontario Association.

"I think the Minnesota Horticulturist an excellent paper and I congratulate you on its fine appearance."—R. S. Mackintosh.

"I have no doubt we shall all appreciate the radical change to magazine."—John Solly, M. D.

"I am very proud of the Minn. Hort. Society and your move at a monthly publication is courageous and striking."—S. M. Emery, Director Mont. Exp. Station.

"The February Minnesota Horticulturist has reached our table, and we are highly pleased with its contents."—Western Garden Pub. Co., Des Moines, Io.

"Glad to hear of the new enterprise. There is need of it. You can count on all of us doing all that we can to make the new magazine a success."—Prof. T. A. Williams, South Dakota Agricultural College.

"I hasten to congratulate you on the first number of the Minnesota Horticulturist. I do not see anything to criticize, except that I do abominate having to cut open the pages."—J. M. Underwood.

"The Minnesota State Horticultural Society has issued a monthly as the exponent of its doings and views. It has Mr. Latham, the secretary of the society, as editor, which is a guarantee of the work being well done. The monthly is beautifully printed on fine paper, and may be had for one dollar, which includes the membership of the society. We welcome the new magazine."—W. R. Dobbyn, Progressive Age.

"No. 1, Minnesota Horticulturist, received. I at first thought I would prefer mine in one bound volume. Perhaps, at the close of the year you will have some bound for exchange and to be furnished members at cost; that would make it all right. I sometimes try to look ahead; I can see that "The Minnesota Horticulturist" is to be a *permanent thing*. When, in describing your mill, I said Latham was studying on attachments, that language was prophetic. Here is the attachment! Better that it comes as an attachment, for when your mill goes to decay, it can be hitched onto another mill, and thus be kept constantly at work grinding out and dispersing the glories of creation.

"I have one little improvement to suggest—have the leaves cut by machinery. When we get hold of a good thing we want it available at once."—E. H. S. Dartt.

NOTICES.

Persons having promising seedling apples, especially those received from Mr. P. M. Gideon, are invited to send scions to Owatonna Tree Station for trial.

Greenwood crab scions will be mailed free to northern sections of the state.

E. H. S. DARTT, Supt.

John S. Harris of La Crescent, is the standing committee of the Minnesota State Horticultural Society on seedling and new fruits, and will continue the work begun several years since of looking up and locating the seedling apples and other fruits and the most valuable wild native fruits of the Northwest.

The coming apple for this climate will doubtless be a seedling produced on our own soil, and as it requires many years to ascertain the real merits of a variety, all persons having or knowing of any hardy and promising new seedling apples, or good native or seedling plums, will greatly aid him in his work by corresponding with him, and sending him samples for examination and description. He is also conducting a trial and experiment station, and will be glad to receive scions or plants of anything new and promising, and will give them a fair trial and report results.

ITASCA STATE PARK.

(SEE FRONTISPIECE.)

The Itasca State Park comprises thirty-five square miles around Itasca Lake and other smaller lakes that are the source of the Mississippi river. This territory has been dedicated forever to the public for this purpose by legal enactment. At present its distance from the center of population in the state precludes any improvements other than to preserve its natural features, with which the engraving shown would indicate it is richly endowed. This view shows the east arm of Itasca Lake with Turnbull Point in the distance.

THE MINNESOTA HORTICULTURIST.

VOL. 22

APRIL, 1894.

NO. 3

Plums and Cherries.

THE SAND CHERRY AS DWARF STOCK FOR THE PLUM AND CHERRY.

PROF. N. E. HANSEN, AMES, IOWA.

A few notes on hardy stocks in general may serve as a fitting introduction to the above subject. The need of hardy stocks for the plum and cherry in the Northwest is well known. Most of the stocks used in the Eastern states are subject to winter-killing in the nursery. The Myrobolan and St. Julian are short-lived and worthless stocks for the plum in the Northwest; and the peach, in localities where the peach root is hardy, is only recommended for the Chickasaw varieties. The apricot has recently been tried as a plum stock, but the experience at Ames the past season does not favor its use for that purpose. The best stock is undoubtedly our native plum. The pits should be saved from the best varieties, as there is some evidence that they give better stocks than pits gathered indiscriminately in the woods. The objection urged is the sprouting tendency, but this is not generally found to be objectionable when the trees come into full bearing.

The Mahaleb is much used as a stock for budding the cherry, but it is not sufficiently hardy at the north and does not form a good union with the colored-juiced varieties. Root-grafting on Mazzard, using a long scion, is much better, as it facilitates rooting from the scion, and the tender root is placed further beneath the surface. Cherry trees, either on Mazzard or Mahaleb, should be set on dry ridge soil with porous subsoil from four to six inches deeper than they stood in nursery.

Propagation of the cherry and plum from root-cuttings is largely practiced in Europe, and in time will, probably, be generally adopted here in the Northwest. It would solve the question of hardy stocks. The sprouting habit would not be objectionable for many years to come, as a vast number of trees will be necessary to supply the prairie orchards.

Experiments with our native wild red cherry (*Prunus Pennsylvanica*), show it to be a very promising stock for the cultivated cherry. Specimen trees on the college grounds at Ames and in other parts of the west, of both sweet and sour cherries, from six to ten years of age, show a perfect union. The only objection is that it sprouts, but this is troublesome only at first; as the trees come into bearing the sprouting tendency is checked.

But there is need of a dwarf stock for both plum and cherry. The native sand cherry (*Prunus pumila*) has been mentioned as likely to answer the purpose. The experience in Utah and various parts of the west with trees of several years growth indicates that it will be desirable for the plum. The union of the wood is good; the trees are dwarfed in habit and come into bearing earlier. The experience with the cherry on this stock is more limited and appears less favorable.

With a view to more exact conclusions, some experiments have recently been made in this line at the Iowa Agricultural College, which are not yet concluded. A report of progress up to date is given in an article by Prof. J. L. Budd and the writer in Bulletin No. 22 of the Iowa Experiment Station, a synopsis of which is here given.

In 1892, about five thousand stocks were grown from seed gathered in northwestern Nebraska. The seed was washed from the pulp, dried for three or four days in the shade, mixed with sand in boxes and put out for winter freezing. The seedlings made a fine stand, and their growth the first season was about equal in height and diameter of stem to our seedlings of the native plum. In the fall of 1892 we took up the largest of the seedlings for crown-grafting, leaving the others for budding.

RESULT OF CROWN-GRAFTING.

PLUM.

Long Blue. (No. 20 Vor.) Russian. Of 75 side grafts, 50 grew, or 66.6 per cent. Growth poor and slender, compared with those worked on native plum roots. Height, from 7 to 16 inches, branched; average, 10 inches.

Wyant. Native (*Prunus Americana*). Of 290 side grafts, 120 grew, or 41 per cent., about as thrifty as those on native plum roots. Height, 7 to 34 inches; average, about 18 inches.

Pottawattamie. Native (*Prunus Chicasa*). Of 194 side grafts, 63 grew, or 32 per cent. Height, 10 to 28 inches, averaging about 18 inches; strongly branched.

Ogon. Japanese. Of 79 whip grafts, 31 grew, or 39 per cent. Height, 8 to 21 inches, averaging about 12 inches.

Of 79 side grafts, 43 grew, or 54 per cent. Tallest, 23 inches; average, about 16 inches, branched.

Early Red. Russian. Of 390 whip grafts, 190 grew, or 48.7 per cent. Height, 7 to 27 inches; average, about 12 inches, much branched.

Of 427 side grafts, 293 grew or 68.6 per cent. Average height, 12 inches, much branched.

The relative growth when side-grafted and whip-grafted agrees with our former experience in grafting the stone fruits.

PEACH.

Of 56 side grafts of Bokara peach on this stock, but one grew. Height, 10 inches.

CHERRY.

1,002 side grafts were made, viz.: 335 Bessarabian, 260 Strauss Weichsel, 152 Lutovka, 255 Brusseler Braune. Of these only five grew, ranging in height from 11 to 16 inches.

SUMMARY.

As our crown grafts of cherry on Mazzard gave an unusually good stand the past year, and also our plum grafts on native stocks gave a good stand, we may conclude that the sand cherry is not a desirable stock for grafting, or else it needs special management and treatment which we do not as yet understand. This may easily be possible, as our prior experience in budding the sand cherry was not a success, while this year it was good for the reason, perhaps, that we budded earlier in the season.

RESULTS OF BUDDING.

PLUM.

The work was begun July 15th and completed July 22d. Out of a total of 1,512 plum buds inserted, only 34 failed to unite. The number of each variety was as follows: 130 Early Red, 143 Richland, 47 Leipsic, 81 Minnesota, 30 Trabesches, 247 Ungarish Prune, 183 Botankin, 164 Burbank, 487 Wyant. 78 buds started viz.: 7 Early Red, 11 Botankin, 59 Burbank, 1 Trabesche, the growth varying from a tuft of leaves to shoots 15 inches in height. The marked degree of excitability of the two Japanese varieties, Botankin and Burbank, is worthy of note.

The budding of some of the varieties was evidently done too early, as we found it necessary to cut the second tying, and the growth had by the close of the growing season extended on both sides of the shield, showing considerable increase in size after the buds were inserted; but our prior experience indicates that the sand cherry should be budded earlier than our native plums.

The sprouts that came up from the stocks where the root-graft failed were budded about the middle of August with Trabesche, Desota, Wolf, Milton and other varieties, and the buds made a good stand. These sprouts were in good condition for budding when the bark on the wood of the previous season would not raise.

CHERRY.

899 buds were inserted July 21-24 as follows: 194 Bessarabian, 262 Sklanka, 54 Yellow Glass, 250 Shubianca (6 M.), 146 Early Morello. 26 buds failed to unite, and 7 started but made no extension of growth. The union is not as good as that of the plum, the edges of the shield being inclined to roll back. The sand cherry is not as favorable for rapid work as the Mahaleb on account of the numerous branches close to the ground. As the roots run close to the surface, the usual remedy of budding low is not practicable.

INFLUENCE OF DWARF STOCKS.

As the sand cherry is only thought to be of value as a dwarf stock, planters must expect smaller nursery trees than those of same age on native plum or other stocks not dwarf in habit. The somewhat imperfect union would tend to load the top with nutriment and hence favor earlier fruitfulness. This is the general effect of dwarf stocks. Pears on quince stocks bear earlier than when on pear stocks, and apples on Paradise stocks bear earlier than when on apple stocks. The effect is similar to that observed in ringing, girdling and wiring limbs of fruit trees and grape vines. The elaborated sap is retained to a greater or less extent in the top, causing the wood to acquire earlier the degree of maturity necessary for the formation of fruit buds.

In this connection it is of interest to note that Mr. C. W. H. Heide-man of New Ulm, Minnesota, has found the sand cherry to bear heavily when budded on native plum stocks, while it was barren of fruit when on its own roots.

It is too early to make positive statements as to the ultimate value of the sand cherry for stocks. As a dwarf stock for the plum in the prairie states it seems very promising. Some of the cherries, especially such very hardy ones as Shubianca, appear to make a good union with it. If they hold out and make fruitful trees, it will surely prove a blessing to the cold North, as we have no other hardy stock except the wild red cherry.

I trust that this paper will draw out the Minnesota experience and observation in this line. It is certainly a question of much interest and importance.

DISCUSSION.

Prof. S. B. Green: I want to express my approval and endorsement of the paper prepared by Mr. O. M. Lord, of Minnesota City, a man who has had experience in growing the plum, who makes it a specialty; and everything that is said in that paper is worthy of our careful attention. There is one point, however, on which I do not entirely agree with him. He refers to the matter of plum pockets being caused entirely by the weather. He goes on to say that mycologists claim that the disease passes from one tree to another, in order to show that it is occasioned by a fungus growth. Now, it is like this, you frequently hear people say that wheat rust is brought about by warm, damp weather. So it is—it occasions the development. You have a cold, you go out doors and expose yourself, and you get more cold; it is the same condition in the wheat plant—the rust is present, but the warm, damp weather gives an opportunity for its development. It is generally present to some extent, and the warm, damp weather gives it a chance for further development. It is the same way with the plum pocket, as it is called; it is undoubtedly due to the effect

of a fungus disease. The question is raised, is there any remedy for this plum pocket? I think there is no remedy. The best way of prevention is to plant the trees where they can get a good circulation of air, but so far as I know there is no real practical remedy for plum pockets.

There is one point in Prof. Hansen's paper where he speaks of girdling, and so checking the flow of sap, that calls to mind a little experience I had this summer in girdling grapes. It is a fact that when there is a circle of bark taken out of the trunk of the grape vine after the fruit has set, or even before, the fruit will ripen much earlier and be of larger size. This past summer I had a certain variety of grapes from which I wanted to get a few good bunches to send to Chicago. I girdled the vine, and although the variety is somewhat late, yet those girdled bunches matured nearly two weeks earlier than the others, and the berries were fully half as large again. I used to girdle a good many each year. I used to girdle with wires, but I prefer to girdle by taking a piece of bark off. Just take out a piece of bark a quarter of an inch wide.

Mr. A. H. Brackett: Does not girdling injure the vine?

Prof. Green: It will probably injure the vine to some extent, but not much.

Mr. Brackett: How is it where you girdle the limb of a tree?

Prof. Green: I would not recommend girdling trees; I girdle grapes sometimes. An experience came to my attention about a year ago; a man had a plum tree that grew near his house that had not borne for a number of years. He built an addition to his house, and in excavating and taking out the dirt with the scraper, they ran against the tree every time and just about completely girdled it. The following year that tree was brought into bearing and bore a fine crop of plums. It shows the effect of lessening the circulation of the sap.

Dr. M. M. Frisselle: Would root pruning have the same effect?

Prof. Green: I think so; anything that has a tendency to weaken it. I should hardly want to use it with the grape vine. Root pruning with trees is commonly practiced. I have known trees to be taken up and set back again, which had the effect of bringing them into bearing the next year.

Dr. Frisselle: What effect would it have to girdle an apple tree about blossoming time?

Prof. Green: I think it would be all right if it was done properly. It would restrict the flow of sap and probably set it into bearing.

Mr. Wm. Sommerville: I do not think it would have any effect at that time. Take it when the bark peels, and it would fruit the next year.

Prof. Green: A girdle an inch wide would remain open a whole season.

Dr. Frisselle: I remember a case where a gentleman girdled most of the branches on a young tree that had refused to bear for several years. It had blossomed, but it did not bear fruit; he girdled most of the limbs just after blossoming, or about blossoming time, and the result was that he had an abundance of fruit that year.

President Underwood: Is there any one here that has had any experience with the sand cherry?

Mr. Harris: My experience with the sand cherry is too short to make much comment on it. Last spring Prof. Green sent me down a bundle of sand cherry stocks, and wished me to try them. I put in about seventy-five and grafted Desota plums on them, and about 90 per cent. of them grew. I think it is a success with the Desota plum. I was nearly through grafting when I received them, and did not try any other variety, but they have done so well that we shall try a few of the other varieties. I think the proper way when you get it on its own roots is to propagate by root cuttings. I know the sprouts are a nuisance, but if the tree is a good one you will wish it had sprouted a great deal more than it did, and if any accident befalls the tree you still have a shoot of the same variety which will grow perfectly true and bear as good fruit as the old tree. I believe this is the best method of propagating our native plums. I also believe there are a great many varieties of apples we find in this country that would be a greater success than by grafts. I have in mind an apple tree that grows down in the state of Illinois. I called the attention of this society to it two years ago. A man had a seedling apple tree that had been cut off, and the sprouts came up and he began to set out those sprouts in his orchard where other trees were missing. I saw that orchard a few years ago; there was only one variety, and the trees stood the winter perfectly. I got a few scions of that tree, but it has never done anything except in the state of Illinois. I believe there are varieties here, if we could propagate them on their own

roots, that would succeed better and make better fruit than by any other process of propagation. These are things that ought to be brought out and made positive facts through the experiment station, and given to the world by the horticultural society through its bulletins.

Mr. Knudson is one of my regular correspondents, and he sends me specimens of every new fruit he gets. Speaking of a choke-cherry, he sent me samples of two distinct varieties, if not of two distinct species. One variety had a bunch seven inches long, the other was a short cluster like currants; but they were larger than currants, a half inch in diameter, and both of them so free from that puckery taste that you can eat them freely and with a relish. I immediately wrote to him that he ought to get them out, and he stated that this long bunch variety was a seedling that he raised, and he promised to send me seed; he did send me some, but I lost it. I do not know that Mr. Knudson has ever been a member of our society, but he is a useful man, and there are a great many that we ought to get identified with this society. He is a Dane by birth, and he is introducing new varieties of fruit to try them. He is growing a gooseberry that is very valuable, and the last thing I heard he had got a plum the size of a Morello cherry that is good and very productive; perhaps there is something in that that we might use on our sand cherry and give us another new fruit. I believe there is no other point in the paper that I want to mention.

Mr. Wedge: I will state in regard to grafting on the sand cherry that I used about 1000 stocks this spring, grafting them on the Desota, Cheney, Rollingsstone and Rockford. The Desota and Cheney made an excellent stand, the Rollingsstone a very poor stand, indeed, and the Rockford also a very poor stand. We grafted at the same time and gave all the same treatment; but I think there is a marked difference in varieties working on the sand cherry.

Prof. Hansen: How were they grafted?

Mr. Wedge: By side-grafting in the root.

Prof. Hansen: Do you use wedge-shaped scions?

Mr. Wedge: Yes, sir.

Mr. Z. K. Jewett: I would like to state something that has been found of benefit. In different places people have planted their plum trees in groves and fenced them in and put their fowls in, and wherever I have seen that, they have always had a good crop of plums. They claimed it was a benefit in the way of

cultivating the ground. It cleaned up everything in the way of insects, and they always raised a good crop. So far as I have seen, it works well.

Pres. Underwood: What part do the fowls play in the success of the plum?

Mr. Jewett: They cultivate the ground and pick up the insects; at any rate the trees were loaded with fruit. They kept that "little Turk" cleaned out entirely.

Mr. Brackett: I planted my plum orchard on the north side of my poultry yard. My plum trees are not in bearing yet, but it was recommended to me. They keep the ground stirred up under the trees, and I think when they come into bearing it will be a great help. I do not think they will need any cultivation at all after they come into bearing.

Prof. Green: I want to say something about that matter. I know a great many cases where that thing has been a decided success. I know of one case in Massachusetts, at a time when it was almost out of the question to grow plums on account of the curculio, where the trees were planted in the chicken yard they were nearly always successful.

Dr. Frisselle: I heard a gentleman say a little while ago that he attributed his success in plum growing to the fertilizing they received from his fowls, and he had the very finest crop. They pick up all the bugs and the worms; but he thought the manure left on the ground had a very sensible and valuable effect.

Mr. Sampson: I would like to ask if currants are not benefitted by being in a hen yard? I believe chickens running around currant bushes are beneficial.

Mr. Harris: They will not eat the currant worm, but I believe the chicken is valuable in a great many kinds of fruit. There are insects that poultry will not eat if you feed them plenty of grain.

QUESTION BOX. PLUMS.

QUESTION.

"How can we originate better varieties of plums?"

Mr. E. H. S. Dartt: Plant pits.

Mr. J. S. Harris: Plant seed of the best varieties and then pick out the most perfect seed of the best varieties, and keep on doing so, and some day you will find out the influence of cultivation and selection will improve a plum as much as other fruits.

QUESTION.

“From what source have our best native plums come?”

Mr. Dartt: From planting pits.

QUESTION.

“What is the best method of propagating plums?”

Pres. Underwood: I believe that question has been answered in Prof. Hansen's paper and in the remarks of Mr. Harris and others.

Mr. Harris: As I have talked about propagating plums by root-cuttings, I wish Prof. Green would tell us how to make the cuttings, how to plant, etc.

Prof. S. B. Green: Prof. Hansen has had a great deal of experience, let him answer that question.

Prof. N. E. Hansen: The experience I have had is that some varieties you can get that way and some you can't. The Minnesota are the easiest to get in that way. Take the surface roots, cut them into pieces about six inches long, put them in sand over winter and plant them right side up in the spring. Plant them with a dibble is the way I have seen. Just the surface roots; plant them in the spring.

Mr. C. Wedge: What proportion will grow?

Prof. Hansen: Some of them will not grow at all. The Minnesota is the easiest in the lot.

Pres. Underwood: Do you know of any plum except the Minnesota that is propagated by root cutting?

Mr. Harris: I had a little experience with the Cheney plum at one time. The Cheney is very easy to propagate from root cuttings; they nearly all grow, and nearly all make very fine trees. My method was to search out the roots, cut them three or four inches long, pack them in sand and leave them until spring. Early in the spring I go along and stick them in the ground so the top end is about a half inch under the surface.

Mr. A. D. Richardson: I have planted the Desota that way, but I have never succeeded with it.

Prof. Green: Mr. Ludlow put in five hundred cuttings, all top cuttings of Mariana, and every one grew. He also put in cuttings of the Desota and Rollingsstone, and three or four other varieties, but he did not get one.

QUESTION.

“What varieties of plums need to be planted together and how far apart?”

Mr. Wedge: I have a fancy that the way to plant plum trees is in double rows, the double rows to be some distance apart, say twenty-five to thirty feet, but the rows to be about ten feet apart and the trees to be about ten feet apart in the rows. I think plum trees need a certain circulation of air, and I think a large grove planted together would not do so well and would be infested with various diseases; but by planting them in double rows it allows a free circulation of air between the rows.

Mr. A. H. Brackett: I would like to ask if any one has tried mulching under the soil?

Prof. Green: I suppose he means by that mulching under the surface, and then covering with soil. I have done it with trees, and it is not quite so unsightly as a manure pile would be. A light covering of soil matters but little. I do not know the relative merit of such mulching.

President Underwood: I think Mr. Knudson suggested that he puts the mulching about a foot under ground and covers it over, and if I recollect rightly it lasts six years—the effect of it. That is something I am not familiar with at all, and if any one else knows anything about it, be prompt to speak.

Mr. J. P. Andrews: Is there any reason why it should be more successful with plums than with any other trees?

Mr. Richardson: I do not know why it should. I have tried that way in mulching evergreens. I mulch quite heavily, and then cover with two or three inches of dirt; it was very successful—never had a failure.

President Underwood: The roots of trees naturally run down, so you could very easily go down some distance without interfering with the roots of the tree; young trees would not send out their roots very far. I know plum trees are very much benefitted by mulching. There is a great value attached to mulching, and this seems to be a new method.

Mr. Jacques: I planted fifty evergreen trees two years ago, and you all know how hard it is to make such trees live, but I mulched freely under the ground and did not lose a tree.

(By request, Secretary Latham again read that portion of Mr. Knudson's paper relating to mulching under ground.)

Mrs. Kennedy: That is the way we mulch our evergreens.

QUESTION.

“What is the best method of cultivating plums, and how can the enemies of plums be successfully fought?”

Mr. Harris: The experience of Mr. Ludlow is that plowing between the rows and running the cultivator quite freely is almost necessary if you expect to get a crop. If you let bluegrass or any other grass grow around the tree, good bye to your tree as a fruit producer. The worst enemy is the “little Turk.” The best practice is to knock the little fellow down on a sheet and destroy him. The next best way is to spray the trees, just as soon as the blossoms have fallen, with paris green every week. I have been unfortunate in spraying; I got it too strong and nearly killed the trees; but they do claim that about one pound of paris green to 300 gallons of water, keeping it stirred and adding a little lime, is a sure remedy. The jarring I know is all right, and if we would follow it up we could soon get the little fellow where we could handle him.

Mr. Dartt: How many insects would you expect to find on a tree?

Mr. Harris: You might find a dozen to fifteen, but if you found but two or three you would find they could leave a good many marks on the fruit.

President Underwood: Is there any further question in regard to the enemies of plums?

Mr. Dartt: I would like to ask Mr. Harris if this “Turk” is the same insect that infests the apple?

Mr. Harris: Sometimes I thought he was, and sometimes I thought he wasn't. Sometimes you find him on plum trees and his bill hangs down that way (illustrating), and on an apple tree he sticks out so. If you magnify them you will find that the one on the apple is not as big as the one on the plum. I think entomologists recognize them as two distinct insects.

Apples.

APPLES.

W. S. WIDMOYER, DRESBACH.

My experience having been very limited in this branch of horticulture, I made it a point to talk with all whom I knew were raising apples, whenever I had the opportunity. I also wrote several personal letters, hoping thereby to find something of interest to report at this meeting, but the results were very discouraging.

Apple trees here came through the past winter (1892-93) in seemingly good condition, but very few trees blossomed, and the crop was almost an entire failure.

Only one tree in my orchard showed any signs of blight, and that was a Transcendent.

Trees set last spring made a fair growth, considering the season. The leaves of all trees fell off unusually early this fall, which I consider a good indication for a crop next year, as there are plenty of well developed fruit buds on all trees of bearing age. I think too much cannot be said about mulching trees in the fall. My oldest trees are all in grass now, (mostly clover) and I think they do full as well as when cultivated by giving a good mulch of very coarse barnyard manure every other fall, just before winter sets in, spreading it well out from the trees as far as the branches reach, and thick enough to keep down grass and weeds. I like to cultivate young trees four or five years after setting in orchard, giving the last cultivation about July 15th; and mulch in the fall to keep frost in the ground as late as possible in the spring.

In regard to trimming, trim any time during the season that you see a branch or shoot that should come off; except in case of large branches, which should be cut out early in the spring of the fruiting year (generally every second year), which will help thin the fruit considerably.

The Duchess for cooking and drying, Wealthy for fall and winter eating, and the Red Astrachan for early fall eating and canning, are about all I have bearing at present. The Astrachan has a very peculiar, rich flavor and color when canned. I am watching the horticultural reports for a good, reliable, late-keeping, winter apple for this part of the state, and when I am satisfied that it is found, will plant a good-sized orchard of them. In the meantime I will experiment in a small way with some of the most promising Russians, in hopes of getting something satisfactory in that direction.

APPLES.

R. H. BUTTERNORE, LAKE CITY.

These thirty-four years past in Minnesota I have carefully pried into the reason why our apple trees get so many diseases and why we fail so often to make a success in orchard raising. The chief trouble, I believe, is *the extreme drought in summer and fall*. Another reason is, our young trees are to a great extent in an imperfect condition when planted; they are injured in digging or handling. I have received some trees from the nursery, some of which, after planting and commencing to grow, got black spots on the bark and blighted and eventually died; while others of the same variety did splendidly. There ought to be more care taken when digging.

I believe also that we do not take care enough when cultivating between the trees; a great many are injured by careless hands.

To succeed in raising an orchard, I believe it should be cultivated between the trees and manured *lightly every year*. The trees should be planted about twenty feet apart each way on the north-west side of an inclined piece of land. I do not mean a hill, for I do not believe a hill is good for apple trees. It *should by all means have a "wind-break"* around it; I believe evergreens are best—have one and my trees are doing well.

When winter comes and the frost is in the ground, I throw some manure between the trees, which will keep the frost in the ground longer in the spring and so prevent the sap from flowing too soon, which I find keeps my trees in a healthy condition. I also notice that the trees that have most limbs on the *south* and *southeast* side do best.

APPLES.

W. L. PARKER, FARMINGTON.

My observations and work in the orchard the past season were very limited. I had very little time and opportunity to gather the material for a report that would be either instructive or interesting, as I spent the summer in Chicago at the World's Columbian Exposition looking after Minnesota's fruits as Superintendent Latham's assistant. The position which I filled, or tried to fill to the best of my ability, gave me an excellent opportunity to note the unusually light apple crop of 1893 (the same may be said of our small fruits). The majority of specimens received were undersized and imperfect, showing the effects of the extended drouth throughout our state the past season.

My trees came through the past winter in very good condition, but blossomed very little, only scattering; the result was I did not have two bushels of apples, where in the year of 1892 I had twenty-five bushels on the same trees, which netted me one dollar per bushel at home.

I think if we would pay more attention to the thinning of our fruit we might change the bearing of our trees, so we would have a fair crop every year. My Duchess trees, fifteen years set, are thrifty and in good condition, also Whitney, Strawberry and some others, set a few years later, are all right; Wealthy, Tetoskfy, set at the same

time, are most all dead, but I have some five or six years set that are healthy and doing well. What we want now is a good winter apple, something equally as hardy as the Duchess, and I am confident we will yet find the ideal long-keeping winter apple in the near future, as we now have some very promising seedlings growing in different sections of our state. I think we have got to look to our seedlings for the coming hardy apples.

We have some very hardy and good apples among the Russians. Take the Hibernial or Lieby for one. I got my first trees as Lieby from a firm in Beaver Dam, Wis., and Hibernial of Mr. Patten, of Iowa, and I do not see any difference in the fruit. They are as hardy as Duchess, and early and abundant bearers, although the fruit is not of the best quality; but it will keep till the middle of December or first of January. I am so well pleased with it that I set out twenty more trees this last spring, and I am going to tie to it till I find something better. I also set out quite a number of the most promising and hardy of the Russians, some eight or ten varieties, and Patten's Greening, which I think a very promising variety. There seems to be an increasing interest shown in our section the past few years. A good many of the farmers are buying a few trees and setting out. They seem anxious to grow apples, but the trouble is they do not know how to manage and take care of the trees after they are set. It looks to me as though they thought all there was to do was to get the trees and set them out and never pay much more attention to them and expect to raise fruit; consequently, the trees die. Then they say, "there is no use to try to raise apples in Minnesota." Now, I think if we could find a variety that would bear as much neglect as our Crescent strawberry we could help out that class of farmers.

I have heard a great many remark that they could raise a few acres of wheat or oats and buy more apples than they could ever raise in Minnesota, and the result is a good many of them do not have apples. Now, the only sure way is for us to raise them, and I do not see any reason why, with the hardy tried varieties we now have, that every family in the state can not raise their own apples, or a few, at least, by devoting a little of their spare time looking after and caring for a few trees properly. Surely the apple is one of the most important and valuable fruits a farmer can raise for his family.

PLAN FOR AN ORCHARD.

S. D. RICHARDSON, WINNEBAGO CITY.

The plan of setting an orchard as outlined in this paper is not original with me, but was published in the papers years ago, though the distance was fifteen feet instead of sixteen.

Plant the north row sixteen feet apart in the row and the next row south of first row twenty-eight feet distant; then plant a row in the center of each oblong square. To find the center of the square take a board sixteen feet long, bore a hole in the center and nail two pieces of lath on each end to form a fork. Place one fork against the tree at one corner of the square and point directly towards the

tree on the opposite corner. Mark the place in the fork of the board in the center of the square, put a stake in the hole in the center of of the board and swing the board out of the way. Dig hole for the tree. Then swing the board back into its place and set the tree.

An orchard set this way has the appearance of being set eight feet by fourteen, yet no tree is more or less than sixteen feet from its neighbor and each tree, except those on the west and south outside rows, is shaded about one P. M. by a tree sixteen feet distant. A piece of land sixteen by twenty rods, containing two acres, will set 372 trees in this manner and leave an eight foot space all around outside of the trees, except on one end, where it will be necessary to set the first row on the line.

DISCUSSION.

DISTANCE APART FOR APPLE TREES.

Pres. Underwood: Have you any remarks to make upon this paper?

Mr. E. H. S. Dartt: That is a good one; that is boiled down, concentrated.

Mr. D. V. Plants: I would like to ask one question. I would like to ask if he considers sixteen feet far enough apart; if it is wide enough for the trees after they are grown. Sixteen feet does not give any space between the trees.

Mr. S. D. Richardson: Every person must act on his own individual judgment. Some trees require more room than others. I think, if I was setting out ten acres of orchard, that when the trees got older and wanted more room, if they did not die out fast enough, I would cut them out. We can always expect to lose a certain percentage of trees anyway. I do not expect anything else.

Mr. Plants: Sixteen feet is far enough apart for trees that grow upright, but I have seen trees that were set twenty-two feet apart, of which the lower limbs were so close together that a man could not walk between them without scratching his face. With Whitney No. 20, it might do.

Mr. Richardson: A man can make room with an axe.

Mr. Harris: I was unfortunate in not hearing the paper read that is under discussion now, but I have had a little experience and some observation. I gather from what I have heard that the proposition is to plant an orchard very close together. I am decidedly opposed to setting an orchard in that way, and I paid a man several dollars this winter to cut down some trees to make more room. If I was going to set an orchard anywhere in Minnesota I would run the rows somewhere near north and south, and put the rows at least forty feet apart, and I would not care if they were sixty; I would put my trees from twelve to fourteen feet apart in the rows, and they would then have room to get out one way and it would afford just as much protection. I believe that is the true method of planting an orchard in Minnesota.

Now, I find most of the trees that have lived a long time in this state stand out alone exposed in every way, with no shade, or else they are on the outside rows of the orchard; and the idea of setting

trees so close together is not a good one. The tree wants to get out into the light just as much as any other living plant. In a few years the lower branches are worthless, they will die off, and your fruit is up where the step ladder will not reach it, and you will need a fire ladder to get it. An orchard of this close planting near Minnesota City, set twelve feet apart each way, does not bear any fruit; once in a while you can see a few apples in the tops.

Prof. Hansen: Mr. Harris' idea is my idea. I plant my trees twenty-two feet apart in rows north and south, as near as I can run them, and sixteen feet apart in the rows, except the Transcendent, which I plant eight feet apart and the rows twenty-two feet apart, and I find that is too near for most trees; that is, the rows are too near together, but the trees in the rows protect each other better than any other way. If I was to set out another orchard, I would set the trees thirty feet apart.

Mr. Dartt: Do your trees crowd the way they are now?

Prof. Hansen: My idea is, they do. The Transcendents are twenty-two feet apart and eight feet in the row.

Mr. Dartt: Any other variety besides the Transcendent that crowds?

Prof. Hansen: There are some that are rather close. The Duchess are rather close where they are twenty-two feet apart in the row.

Mr. Dartt: Do they crowd that way?

Prof. Hansen: If they are planted close together, eight feet apart in the row, I think they are protected from the sunshine; the rows I would put thirty feet apart.

Mr. Dartt: Mr. Chairman, I suppose I have had more actual experience than all the gentlemen that have spoken on orcharding. I expect I have had, perhaps, twice or three times as much. In Minnesota where we do not expect our trees to attain a great age, and where we cannot wait for them to attain a great age, I think sixteen feet apart is just about right for the average trees. Of course, at sixteen feet I cannot let them branch from the ground—I do not approve of that kind of a tree anyway. I want a good top to the tree and a good body, then let the branches run a little; but, otherwise, I want room between the rows to pass through with a team; this I must have.

Now, I do not approve of scattering an orchard over the whole farm. I do not approve of putting the rows far enough apart so we can raise a crop, as a rule, between the rows; I do not think that is a good plan. I think it is better to have an orchard by itself; you can take better care of it than if you mix it with farming. The orchard, in my opinion, needs special care, and it will be more likely to get it if you concentrate your efforts on the orchard alone, than it will if you are trying to raise farm crops between. And then, the protection that one tree gives another is better secured if trees are planted reasonably close together than it is if they are so widely scattered. I do not know but this is all I ought to say. I believe in reasonably close planting.

Mr. Somerville: I would agree with my friend Dartt that if I were to set out another orchard I would plant it close together. Three years ago I set out a young orchard of 800 trees; I set them out six

teen feet apart, and every other row I broke joints. You understand I set them sixteen feet apart, and then in every other row I set one in the space between, making them nearly sixteen feet apart, so I can drive my team down the row and mulch them. I cultivate them, and I intend to have them all grow. I intend to keep them there; and if I had them scattered out over ten acres and cultivated something else between, I would make a certain failure with my trees; I would not take the same care of them I would if they were on a smaller piece of ground. I mulch my trees every year to maintain the moisture in the ground. This is essential to the growth of the trees. You cannot expect to set out an orchard and have it grow without special care; with that special care we can raise apples and raise them in abundance in Minnesota without any trouble. I have had an experience in this matter with fifty Duchess trees I set out in 1860. They were set sixteen feet apart. The ground is shaded all over, and it keeps the ground more cool, and, with the mulching I put on, the limbs do not die out of those trees, and they bear fruit right along to the very last branches. Now, in the winter I take a sled and one horse and go through the rows and put a mulch of long manure around my trees; I put this mulch around every tree, and in that way I have never failed to raise a good crop of apples every year for twenty years. This past year has been the nearest to failure with me according to the number of trees I have set out in that length of time.

There was some talk here of not having a windbreak around the orchard. My experience differs altogether from that. We have no timber in our part of the state within ten miles of where I live, and you cannot raise an orchard there unless there is a windbreak around it. At no time this winter, the way my orchard stands, has the thermometer run below 10° below zero, while on the prairie it has been as low as 50°. And there is another thing, it keeps the apple on the tree until it is fully matured, where, if the orchard was exposed to the wind, it would blow off one-half of the fruit.

Mr. Brand: My friend from Owatonna boasts about the great experience he has had, the large number of trees he has planted, the long number of years he has been engaged in planting trees and the way he plants. It is like the philosopher's scales; the one man who has had experience with one tree and has produced the largest quantity of apples out-weighs all that he has done. We had reference to that last night in the quiet work of the investigator and the introducer of new varieties—anything that tends to improve the condition of man. It is not the large amount of work he does, but the way he does his work and the kind of work he does. My observations have been very extensive, but I am not going to speak of my own experience entirely, although it has extended over a good many years.

With reference to the distance trees are planted apart and the value of them, I have always found those trees grew the best that had the most room, and, if I were to single out instances, I might mention two trees in this state which have produced the most fruit of any trees I know of. One is a Duchess, which produced twenty-

five bushels of apples; the other is the Catherine, which produced a much larger amount and has been in bearing for twenty-five years, and there has been no other tree within fifty feet of them.

A tree to produce a large crop of fruit has got to have room; it has got to have air. "Wind" has a good deal to do (laughter) in making trees have fruit, and we need a good deal of wind too. If you plant your trees at long distances apart, the roots have plenty of room from which to draw sustenance; there must be something drawn from the soil. The roots of an apple tree fifteen years old extend thirty feet in all directions. If you confine trees in a narrow limit, you weaken the tree, and a tree in a weak condition is in a more favorable condition to be attacked by disease than when healthy and strong. Warding off and preventing these diseases we must consider, and the best thing we can do is to begin right and place the tree in the most favorable position we can. The rows should be planted thirty feet apart, and sixteen to twenty-five feet apart in the row, twenty-five feet is better. My friend Somerville is a very good sort of a man, but he is liable to forget some things. He says his trees never blight; he has always told us that. A year ago last summer when the conditions for blight were favorable, I went down there. He met me as I drove up and shook hands with me. I said: "How are your trees, Mr. Somerville?" "Well," he said, "Mr. Brand, I am sorry to say my Russians are blighting for the first time." I looked among his Russians and I found considerable blight, but he has forgotten "considerable" of it. We must take not only one man's testimony, but the testimony of several, and we will be a good deal more likely to get at the facts in the case.

Mr. Dartt: I expected last night I would get a little chastisement, I guess I deserved it, and I am rather glad I got it. Well, now, in isolated cases in this country, you can find great trees spread out and bearing great crops of fruit; but that is not the rule. Now, then, how many trees have died out to give those trees that he referred to more room? Perhaps, if they were counted up, the farmer who owns the farm where those trees are would tell you he lost 100, may be more. It is simply the "survival of the fittest," and because a man lives to a great age, and becomes learned and great, like our friend, that is no evidence that it would be the case with the majority of men, and isolated cases do not prove that this is the rule with trees any more than it is with men. The rule is that apple trees die young, and we cannot very well expect or prove the opposite. That has been the experience of everybody. There are some trees—now the Transcendent, I would plant them close; if you let them grow they will spread over a great deal of ground. They are good for nothing. They are like some of those "windy" folks, they spread a great deal but amount to nothing. (Laughter.) Plant an orchard the way experience proves it to be the most favorable. I have got more money from an acre of ground planted closely with Duchess apple trees than any man in Minnesota has got from the same amount of ground from any other fruit, except strawberries. I planted them ten by twenty feet apart, and some as close as sixteen feet, and they paid remarkably well, and they died off fast enough so that at the present time the trees are not too close together.

Mr. Harris: I ought not to talk on this question, perhaps, but if I ever become as old as Mr. Dartt, perhaps I will change my views. In all my observation I have found that the end tree of the row was worth more than any three trees in the orchard. There is one tree in my son's orchard that bears twenty-five bushels of apples, and that one tree bears more apples than any other three trees, but the others join each other and are crowded. That tree bears first class fruit every year; it is free from insects, and most all of it is merchantable. I want room between the rows for a good circulation of air, and I want to get through with the team to haul in fertilizers, and the roots also want plenty of room. At one time I adopted the theory of the men around Minnetonka. If I were to set an orchard now, I would set the rows forty feet apart anyway.

Mr. Wm. Toole being called for, made the following remarks:

Mr. Chairman: I am very much interested in the discussion, and I cannot gainsay a man's plain statement of facts. I am not an advocate of extremely close planting, and I do not know of any experience coming under my observation where I have seen an orchard that has survived that kind of planting. The growth, perhaps, was luxuriant enough, but I have never seen an orchard of that kind after a number of years that was fruitful. The trees seem to require a reasonable amount of room and air in order to do their best, and I have never yet found in planting closely and expecting the trees to die out, that they would die out in any reasonably fair order. I would much rather plant at a fair distance apart and replant if they die out.

Mr. Dartt: How close would you plant?

Mr. Toole: In Wisconsin we regard an orchard as very valuable, and I doubt if any one would feel like planting closer than twenty-five feet, twenty-five feet to two rods apart.

Mr. C. Wedge: I would like to hear what the experience of others has been in in this matter.

Mr. C. G. Patten (Iowa): I am somewhat like Mr. Toole. It seems to me we have had some positive statements here showing great success in both close planting and in planting a great distance apart, and it would seem to hinge a good deal upon the varieties in the first place, and in the care the trees received afterwards. Mr. Somerville gives an experience of close planting and the great care he expends on that orchard. Mr. Dartt has also planted closely, and he is successful, while other men have planted at greater distances and been equally successful. Of course, the discussion here is in reference to Minnesota, but I do not live very far from Minnesota. Our experience would, perhaps, not be very different, and our conditions would not be very different. In planting Duchess, my first experience was planting a portion of the orchard fourteen feet in the row. The other varieties were killed in 1884 and 1885. Were I to plant again, I would not plant the Duchess fourteen feet in the row. There are two objections to this close planting. Trees that have endured for quite a number of years like the Duchess, in a very dry season, when the trees become from fifteen to sixteen years of age, they exhaust all of the moisture in the soil, and they require more than they can get, unless they are very highly

fed and planted a long distance apart; and being so closely planted they exclude the sunlight; and my experience is that the fruit is not nearly so abundant as on trees of the same age that are considerably isolated.

WINDBREAKS.

Mr. C. G. Patten: In reference to windbreaks, Mr. Somerville did not tell us how far away from the orchard his windbreaks are, and that I regard as a very important point in talking about windbreaks around an orchard. If the windbreak is to be planted close to an orchard, or if the orchard is a small one and surrounded on all sides by trees, my experience is that it is very detrimental to the orchard. A successful orchard cannot be grown on a very sheltered place. If windbreaks are planted a distance away, ten to fifteen rods, then I would agree to surround the orchard with a windbreak; other than that I should prefer not to have any at all.

Mr. Somerville: As far as the windbreak around my orchard is concerned, my orchard is on the opposite side of the road from my house, and then I have a row of evergreens close to the orchard right along the line of that road, and the trees are within two or three rods of that windbreak on the west and on the south, but on the north they are not so close; neither is the windbreak so thick on the north side as it is on the west and south, and the trees do not appear to do so well against that windbreak—they do not bear fruit so well. But yet I found this, in that hard winter of 1883-4, where I had my trees set in rows they killed out away from the windbreak; and some of those that stood close to the windbreak are bearing fruit today.

As far as close planting is concerned, I think Mr. Keel has been very successful. Mr. Harris has seen his orchard. I do not think I ever saw an orchard in my life as fine as his, and I think Prof. Green will bear me out in that, and so will Mr. Harris, and they are only eight feet apart along the row and ten feet in the row, and I have never seen better crops than he gets. A year ago last fall, he sold 3,000 bushels of apples.

Mr. Harris: Mr. President, I believe if we ever calculate to make orcharding a success on these broad prairies, we have got to have windbreaks, but planted too close to the orchard they are detrimental to it in a similar manner as planting trees too closely is detrimental. If our farmers have not the means to start a windbreak, it would be a good idea to make an orchard windbreak of a couple of hundred trees away from the other orchard, planting them close and letting them answer the purpose of a windbreak. I saw those apple trees of Mr. Keel's, and they bore bountifully; when you get a barrel of apples from a tree that has been planted only eight years it is doing remarkably well, and his orchard, too, is in a place where it gets a great circulation of air—but, I tell you, it cannot keep that up. I doubt whether he will ever see as good a return from those same trees as he had a year ago last fall; and if the time ever comes that we get that scab or leaf disease that is going through Michigan now, and which devastated the orchards in eastern Wisconsin last

spring, if it ever spreads over this country those close planted orchards are going to the brush pile; and it would be dangerous to advise our farmers to set their orchards close.

Mr. D. F. Aiken: I have a few trees I call an orchard, and I want to say a few words on this subject of windbreak, since it is called up. I believe in windbreaks, and I believe this windbreak is especially essential on the east side of the orchard on account of those east winds that do more harm than any west or northwest wind. My orchard has a row of white willows about forty-five feet high around it and two rows on the east side, which are about four rods apart. That does the best for my orchard, and it is open entirely on the north and south, and it gets a free circulation from the north wind and also from the south.

Mr. Richardson: There is an old saying, "The proof of the pudding is in the eating." I call to mind near Winnebago City three or four orchards that are giving good returns. There is one that has no care whatever, and a year ago I saw trees there with a body perhaps twelve inches through, loaded down with apples until they touched the ground. There is another large orchard that has a row of evergreens on the north and west, and still another that is open on the north and west, and I do not see but what they all fare alike. There is another man who has his orchard seeded down, and he has windbreaks on all sides except the east, and his trees are quite a distance apart, and he mulches his ground about three inches deep with long manure, and last year I saw Wealthy trees there that were carrying all they could hold. He calculates he is going to have a crop every year. One man near there made \$800 out of his orchard last year. He had a windbreak of evergreens on the north and west. There is some advantage in having a windbreak, it does not allow the wind to blow the apples off, otherwise, I cannot see much advantage.

Mr. Dartt: I think I ought to say a word or two on the windbreak question. In my extensive experience, to which my friend Brand alluded, I have found out some things that I think I know. Now, a windbreak offers protection only to a limited extent. Trees standing within one to three rods of a windbreak have done well in some places, where the same variety on the same kind of ground six or eight rods from the windbreak have killed out entirely. I refer to the Duchess. I have such a place as that, and in my largest orchard the rows standing within one to two rods of the windbreak have done a great deal better than those standing further away from the windbreak, so that the windbreak must be close by in order to afford good protection. Now, as the kind of windbreak. I would not have a dense windbreak; I would have trees enough to stop the force of the wind, but at the same time I would secure a free circulation of air; I would not shut off the air, but it should be just thick enough to stop the force of the wind and hold the snow. Now, there is another point; we want moisture in the orchard—that is what it needs more than anything else in Minnesota. Now, if you have the windbreak dense enough to stop the force of the wind and open enough to allow a free circulation of air, the snow will drift into the orchard, and when it thaws it will make moisture and will help the orchard.

THE TRANSCENDENT.

Col. J. H. Stevens: I wish to congratulate the society upon the conversion of our good friend, Mr. Dartt. He even admits that he made money off from an acre of Duchess apples, when he thought a few years ago it was doubtful if we could raise apples at all; but I am happy to say that he has got his eyes open and admits that Minnesota can raise apples.

I wish to protest against one thing he said. He said the Transcendent was worthless. If he traveled over those broad plains and vast prairies and should go into a little farm house and get one of the most delicious pies he ever ate made from the Transcendent, then, perhaps, he would be willing to admit that the Transcendent was of some value, especially if he belongs to the class of people known as epicurists. I think the horticulturists are all fond of good living. The Transcendent is the poor man's tree on the prairies of this country, and while it may not be as good as another apple, if he could see how it was appreciated by those people in the West, he would admit that it was of some account.

Mr. Wm. Toole, of Wisconsin: Following out the line of thought pointed out by our friend Dartt, if any of you have ever observed, there is the effect of what we might call the rebound of the wind. You have perhaps noticed that near a close wall of any kind, where the wind strikes against it, the ground is in some places more bare than if there had been no windbreak whatever. In that case you have a very good example of the rebound of the wind, and the conditions are much worse than if you had no windbreak at all. In Mr. Somerville's case he has a windbreak open enough to allow the snow to drift pretty well, and the conditions are much more favorable.

In regard to the Transcendents, we are fortunately enough situated so that we are not confined to the Transcendents. If you are so situated that you wish to dry fruit, the Transcendent is one of the fruits that really improves by drying.

Mrs. A. A. Kennedy: I was brought up in a fruit country, but I would rather today have the Transcendent dried than any other apple I ever saw, and I believe our broad prairies would not be inhabited today if it had not been for the Transcendent. When we came there, there was no fruit, and we could not live without fruit; we could not have it shipped to us; but the Transcendent was just the tree for the prairies, and, as I said before, I do not believe the prairies would have been inhabited had it not been for the Transcendents. I hold up both hands for the Transcendent. (Applause.)

Mr. Dartt: I do not want to get like Smith's mill so you would have to tie me up (laughter); but if I have one side of the question alone, you must give me more time. I think the difficulty about this question is that the advocates of the Transcendent are behind the times. They have not kept up that progressive speed that our friend talked about. I have progressed and he has stopped. Now, the Transcendent used to be a grand good tree, it used to be very productive. Twenty-five years ago in Wisconsin it was a grand good tree; it would grow and it would bear; but somehow since getting into Minnesota it fails. In the first place, the tree blights so badly that it is not worth planting; it is almost certain to blight so

that it is good for nothing; it will blight down so it will be about ruined, then it will keep on growing for a year or two, then the blight will strike it again, and once in a great while it will bear a crop of apples. But in late years it blights to death and hardly ever bears, and besides that we have progressed far enough in the southern part of the state so that we do not need the Transcendent.

A Voice: How far apart did you plant them?

Mr. Dartt: I planted them twenty feet apart each way, the most of them. I do not know whether that is the reason they have not done well or not.

Mr. Pearce: In the first place I should want all the air I could get from the west and the north. I do not think the cold kills the trees, and I do not think the wind does the tree any harm. So far as planting trees far apart is concerned, I think that depends upon the variety; but I think they should be planted twenty feet apart at least. If we are going to plant an orchard we must make calculations as to what we are going to put into it. If you are going to plant a large spreading tree, you must make different calculations; it all depends upon the location and the kind of tree. You can lay down no law by which orcharding must be governed; a man's intelligence must govern it. The wind I consider no detriment; I think if a tree is in the wind the apples will be better and stick closer. You can put your orchard right behind a grove; it will produce fruit, but that fruit will not hang on, but if put right out in the prairie where it will get the full effect of the wind the apples will stick to the tree. I am no friend of the windbreak, except on the south side.

About Transcendents—I do not want Transcendents; we have better varieties. A person who advocates the Transcendent is a good deal behind the times in horticulture. We have varieties today that are far ahead of the Transcendent; for that reason I discarded the Transcendent. I believe in progression. Because a thing was good forty years ago does not prove that it is good today.

Mr. B. Taylor: I just want to endorse what Col. Stevens has said about the Transcendent, and also what Mrs. Kennedy has said. I want to endorse what brother Dartt and brother Pearce say about the Transcendent. Take all these facts and put them together and you have a good report. With me, Transcendents are a failure. It had great value once, but it ceased to be valuable in the fruit region. We have better kinds, and we do not want to plant Transcendents.
—*To be continued in May No.*

MINNESOTA HORTICULTURIST:—The Minnesota State Horticultural Society has adopted an extremely practical and valuable innovation. Instead of publishing its annual proceedings in one volume, in mid-summer, it is now publishing them in monthly parts. This method makes the excellent matter in possession of the society's secretary available for the members when it can be made most useful, and in this lies the great value of the new method.—Farm, Stock and Home.

THE "TWIG BLIGHT" OR "FIRE-BLIGHT" OF THE APPLE.

A. F. WOODS.

From Report of 1893, Neb. State Horticultural Society.

During the month of October, 1892, the Botanical Department of the Agricultural Experiment Station sent out a list of questions with the object in view of bringing together the experience of Nebraska horticulturists concerning "twig-blight" of the apple. There were *one hundred and three* sets of questions sent out and fifty sets were returned with most of the questions answered. While the department regrets that there were not more answers received, still it believes the results of the inquiry to be of practical value to the fruit growers of the state and may at least serve as a foundation for a more complete record.

SUMMARY OF THE KNOWLEDGE OF THE DISEASE.

Cause.—The disease is caused by a certain minute single-celled plant, one of the "bacteria," named *Micrococcus amylovorus* B., and by no other. One or more of these bacteria gain entrance into the young, succulent parts of twigs, increase rapidly in numbers, and destroy the young growing cells of the twigs, thus causing their death.

Infectious.—The disease is extremely infectious, the bacteria being carried rapidly from tree to tree by the wind.

The Bacteria.—The bacteria remain alive in the twig long after it is dead. They may dry up in the form of dust and thus live in a dormant condition indefinitely; they may grow in any dead and decaying matter containing starch or sugar, and are not destroyed by acid solutions, as are many other bacteria.

Species of Trees Affected.—The disease is most troublesome in the pear, apple and quince, but affects many other near relatives of these. The different varieties of apples are affected in different degrees.

Conditions.—It is generally held by investigators and those acquainted with the disease that watery, succulent growth offers the best conditions for the development of the disease.

Remedy.—Removal and destruction by fire of the diseased parts is, so far as known, the only remedy. It is held by some that anything that will produce hardy growth, instead of watery, succulent growth, aids the trees in resisting attack.

RECORD OF ANSWERS TO QUESTIONS ONE AND TWO.

(1.) What varieties of apples have you found least affected by this disease, and (2) what varieties most affected?

[Here follows a long list of varieties few of which are adapted to our climate.—Sec'y.]

Taking out those varieties that have at least six favorable reports, with very few or no unfavorable reports, we have in the order of freedom from disease:

- | | |
|--------------------------|------------------------|
| 1. Duchess of Oldenburg. | 7. Haas. |
| 2. Wine Sap. | 8. Rawle's Janet. |
| 3. Ben Davis. | 9. Small Red Romanite. |
| 4. Walbridge. | 10. Utter. |
| 5. Wealthy. | 11. Perry Russet. |
| 6. Iowa Blush. | 12. Whitney No. 20. |

Those most affected we find in order named:

- | | |
|-----------------------|--------------------------|
| 1. Transcendent crab. | 7. Hyslop crab. |
| 2. Domine. | 8. Cooper's Early White. |
| 3. Talman Sweet. | 9. Missouri Pippin. |
| 4. Willow Twig. | 10. Yellow Transparent. |
| 5. Fameuse (Snow). | 11. Golden Russett. |
| 6. Stark. | 12. Pewaukee. |

Both of these lists might be greatly enlarged were there more data at hand. It is evident from the reports thus far compiled that very few, if any, of the eighty-one varieties named are entirely free from the disease under all conditions. Again, there are some generally reported as "bad blighters" that appear in the list of "least affected." These facts indicate the possibility of so controlling the growth of the tree that it may successfully resist the attack of the blight bacteria.

THIRD QUESTION.—What do you do to check the twig blight?

CUT AND BURN.

In answer to this question there were twenty-one correspondents who "cut out and burned the blighted parts, thus controlling the disease with fair success." There were three who also "cut out and burned the bad blighters." There were three who, "in addition to the destruction of blighted parts and bad blighters, also stopped cultivation and seeded to clover." Two correspondents said "cut out and burn the blighted parts when the trees are through blighting."

SPRAYING.

There were three correspondents who used spraying mixtures, two "with no success" and one who did not say whether successful or not.

ROOT-PRUNING.

Root-pruning is said by one correspondent to have been "successful in checking blight in Talman Sweet in the orchard." Another correspondent "root-pruned in the nursery row."

SALT AND LIME.

One correspondent used a liberal application of "salt and lime to the surface of the soil." Another used "lime, ashes and manure."

NOTHING.

Six correspondents did nothing, and seven gave us answers to this question.

FOURTH QUESTION.—Have you noticed anything in regard to locality, slope, altitude, protection, soil, etc., that favors or checks the disease?

CONDITIONS FAVORABLE TO BLIGHT.

"Trees in rich, hot and moist localities," are reported by seven correspondents as "blighting the most." Two correspondents reported "blight worse in wet seasons." Six correspondents said "trees protected by timber belts so as to prevent free circulation of air blighted most." Three reported "southern slopes favorable to blight," and one reported "severe pruning was followed by the disease."

CONDITIONS UNFAVORABLE TO BLIGHT.

Five correspondents reported "trees on high rolling ground" as "least affected." Five correspondents reported "trees on northern slopes not so badly affected as those on southern slopes." The three who reported against southern slopes should be considered here, making eight in favor of northern slopes as opposed to southern. One correspondent said that "a windbreak on the south of the orchard aids in reducing the blight."

FIFTH QUESTION.—Are young and old trees affected to the same degree?

Twenty-two correspondents reported "young and old trees affected to about the same degree" Six correspondents reported "young trees most affected." Four reported "old trees most affected." Sixteen correspondents gave no answers to this question.

SIXTH QUESTION.—What did you estimate your annual loss to be by this disease?

Seven correspondents reported "loss small on account of destruction of diseased parts." Two reported "loss small on account of planting non-blighters." Eleven correspondents reported an average loss of "five to ten per cent." "More than ten per cent." (fifteen to fifty), "mostly in the nursery row," reported by five correspondents. "Loss small with no care taken," reported by two correspondents. Four correspondents said that their trees were "not troubled with blight," and sixteen gave no answer to this question.

SUMMARY.

In bringing together the results of this inquiry in the form of a summary, I shall simply indicate, with few comments, the direction of the evidence gathered above.

VARIETIES AFFECTED.

The evidence indicates that certain varieties of apple trees are less affected than others, but that few, if any, varieties are *proof* against the disease.

CONDITIONS.

It appears that such conditions as hot, moist locality, rich soil, lack of free circulation of air (on account of protection by wind-breaks, etc.) cause a watery or succulent growth of the tree which is favorable to blight.

On the other hand, high, rolling, well drained ground of north slope and free circulation of air offers the most favorable conditions for hardy growth of the trees, which are, therefore, less liable to blight.

HOW TO CHECK THE DISEASE.

So far as yet known the best way to check the disease is to cut off the blighted twigs several inches below where they are dead and burn them immediately.

Root pruning may cause a decrease in the water supply and thus be valuable in checking succulent growth.

Stopping cultivation and seeding to clover might have the same effect. The effect on the tree of *salt, lime* and *ashes* applied to the surface of the ground needs further investigation.

Spraying is a useless waste of time and money, since it cannot possibly affect the blight.

Finally, if you are going to plant an orchard and wish to guard against "blight," the indications are: *First*, plant varieties *least liable to blight*; *second*, plant on *high, rolling, well drained* ground of *northerly* slope; and last, plant no windbreaks, except, possibly, on the south or southwest and at some distance from the orchard.

 BEHAVIOR OF THE RUSSIAN APPLES IN 1892.

PROF. J. L. BUDD, AMES, IOWA.

From Report of 1893, Neb. State Horticultural Society.

This topic, assigned me in your program, would make an extended paper if given in detail. Perhaps, a few facts in regard to the behavior of the east European apples, stated in a general way, may have some interest.

NOT AFFECTED BY SCAB.

It is now generally known that what is known as *scab* of foliage and fruit is rapidly on the increase in the parts of the Union east of the Rocky mountains. Even in western New York and Michigan, it has recently been so general that it has raised the question of the possibility of breeding scab-proof varieties. To an extent not fully realized, the shortage of the apple crop in the prairie states the past season was caused by the attack of scab in the blossoming stage.

Under these circumstances the fact is significant that the Russian varieties and their seedlings are mainly, if not entirely, exempt from the disease. On the college grounds at Ames, all the common varieties of west European parentage were attacked in the blossoming stage by scab, as were the Siberian crabs, and even our native crab and its seedlings, such as Soulard, Fluke, and others; yet a careful examination of the Russian varieties failed to reveal a diseased leaf or specimen of fruit, even when their branches were interlocked with those of Gros Pomier, Fameuse, McIntosh Red and other sorts which were diseased to such an extent as not to show a perfect leaf or specimen of fruit. This has been the case so far as known over Iowa and eastward to the Atlantic. The Russian seedlings, such as Patten's Greening, Wealthy, Wolf River, Whitney No. 20, Princess Louisa and others, have also been free from the disease, as have our hundreds of crossed seedlings from Russian mothers.

HEAVY BEARING IN 1892.

On the college grounds, the Russian varieties that were not very heavily loaded in 1891 bore heavy crops in 1892. In all parts of Iowa, this report has been constant. At the meetings of the two northern Iowa horticultural societies in December, at Cherokee and Humboldt, the fruit tables were well loaded with clean, perfect fruit. At the meeting at Corning, in southwestern Iowa, it was assumed that the large fruit crop in the northern half of Iowa was made possible by lessened rains during the blossoming period; but our weather service reports show far more rainfall at this critical period at the north. Careful inquiry will develop the fact that the bearing trees were Russian, or the Russian seedlings above named. We can only conclude that the increased crop resulted from (exemption from) scab and, possibly in part, from the fact that the Duchess and most other Russian sorts have thicker and firmer flowers in all their parts than the west European varieties, which enables them to endure climatic extremes.

TENDENCY TO BLIGHT.

As a rule, without known exception, the varieties from the coast provinces of Russia are as subject to blight as are the Siberian crabs. Yet we find among the varieties from St. Petersburg many that are not more subject to blight than the Duchess or Grimes' Golden; but careful inquiry will show that such varieties are strays from the interior provinces. As a rule, with very few exceptions, the varieties from the Volga provinces and those from the black soil region where dent corn, melons and tomatoes ripen are as free from blight as the best of our common varieties. Our reports up to the present show that fully ninety varieties are fully as free from the disease as the Roman Stem. It is now well known that the Russian apples run in families. In every case we find some varieties of every family free from blight, or as nearly free as any variety we have. Even the Yellow Transparent family has its non-blighting varieties. Our wide distribution of the past twelve years for trial on varied soils and exposures has told the story as to tendency to blight in a very conclusive way.

WIDE ADAPTATION.

It has been a matter of surprise to find that some of the Russian apples thrive well and bear heavy crops of perfect fruit beside the orange groves of southern California, where our common varieties of the apple of west European parentage fail in foliage and fruit. For instance, the most perfect and fruitful varieties of the apple in the vicinity of Pomona, in south California, are the Duchess, Alexander and Winter Aport (No. 252). A number of examples of this kind have led to placing the Russian fruits on trial at all the stations of California. It is also found that some of the Russian apples and cherries are thriving and bearing better in Texas and Florida than any of the common sorts of the Eastern states. Those who have spent a summer at Saratov on the Volga will not be surprised with this statement. All vegetation must there endure a degree of heat and aridity of air such as is not known at many points

in this country. While the trees and fruits of interior Russia can endure intense summer heat and a desert air, they can also endure intense winter cold, on account of their perfect ripening of wood in autumn. But experience shows that they can live and thrive without the cold of winter. The main problem presented is the wise distribution of the fruits from the widely separated provinces of east Europe. Our only guide has been actual trial, and this is now giving us much information from all parts of the country, from Winnipeg to the Gulf and from the Atlantic to the Pacific.

BEHAVIOR.

As the quality and season of the Russian apples have been in dispute, it may be well to include a brief statement under this general head of "Behavior."

As to quality, it can be said in a general way that in eastern Europe the distinction between varieties exclusively used for cooking and dessert is run closer than with us. Quite a large number of large, smooth and handsome varieties of the Hiberna, Apport and other families contain a very large per cent. of pectin and grape sugar, but they are off on flavor for dessert use. That they excel any west European or American variety for pies, sauce or jellies is now conceded in the sections where they were planted ten years ago.

On the other hand, every variety of summer, fall, and winter apples listed by Dr. Regel, Dr. Schroder or Dr. Arnold, for dessert use is fully up to the Early Harvest, Fall Orange, and Baldwin in quality, and in many cases they reach the standard given to Red June, Benoni and Jonathan. Of course, this is not in accordance with public opinion outside of the neighborhoods where they have been fruited in large numbers for several years.

As to season it may be stated in a general way that every variety from the coast provinces or any part of west Russia will mature in our climate in the summer or autumn; but among the varieties imported by the Iowa Agricultural College from the interior provinces where dent corn ripens, we find a number that will keep as well in southern Iowa as Jonathan, Grimes' Golden, Ben Davis and Willow. At the recent meeting in the northern half of Iowa, a number of varieties were shown which were so late in season that the past year they failed to color up properly prior to apple picking time. Even varieties like Rosy Repka, Good Peasant, Amsein (Anisim), and Varonesh Rosy, which color up beautifully and keep as well as Jonathan in southern Iowa, do not color up perfectly at their northern limit of growth, and they can be kept until May.

PREPOTENCY.—This also can properly be included under the head of behavior. The fact that Russian varieties run into near family variations, like our native plums, indicates purity of breeding; in other words, that they are not mongrels, like nearly all our so-called American varieties.

In our work of crossing we have indicated this purity of breeding in a way that promises to be very useful. Our seedlings, for instance, of Hiberna crossed with pollen of Grimes' Golden and Osceola are uniform in height, foliage, and expression. They all show the Hiberna traits, including the habit of early and perfect ripening of their

wood in autumn. So far as can yet be noted they follow the mother perfectly in hardiness. Just how much they will be modified in fruit we have not yet determined. In many other cases, we have this important law verified where we have used Russian mothers and the pollen of our best known apples.

In the use of the Desota plum for a mother, we note the same law. We used on the blossoms of Desota the pollen of Kelsey Japan, and in every case the resulting seedlings are *American* in habit of growth, leaf, and expression. But in this case we find the influence of the Japan variety in the fruit, as it is blue, has bloom and is sutured much like the Kelsey. Its size we have not yet determined, as the rapid growth of the seedlings has so far starved the fruit, as is apt to be the case with young trees making rapid growth.

LAKE CITY HORTICULTURAL CLUB.—A meeting was called at the office of the Jewell Nursery Company on Saturday, March 3, 1894, for the purpose of organizing a horticultural club. After a most excellent picnic dinner, participated in by about thirty people, the meeting was called to order by J. M. Underwood, who briefly stated the object of the call. On motion, J. W. Kennedy was elected chairman and Miss Naomi K. Stevens, secretary.

After the reading of an excellent and amusing paper on the subject of a vegetable garden, by Mrs. Anna B. Underwood, a discussion on the best manner of raising different vegetables followed which was participated in by Messrs John Horrigan, Nels Anderson John Wear, Rev. E. B. Chase and J. M. Underwood. This interesting discussion was followed by the reading of a paper on the raising and culture of strawberries, prepared by W. H. Biddle, after which there was further discussion on the best methods of raising, cultivating and handling this fruit, and also considerable debate on the merits of different varieties.

The suggestions and ideas offered in regard to the culture and raising of vegetables, strawberries, etc., fully demonstrated the practicability of organizing a horticultural club to meet at the office of the Jewell Nursery Company, or at such other place in Lake City as might be decided upon.

On motion, J. W. Kennedy was elected president and Miss Naomi K. Stevens secretary of the Lake City Horticultural Club, and it was resolved that the first meeting be held at the office of the Jewell Nursery Company on Saturday, March 24th, at 11 o'clock a. m.

All persons interested in the raising of fruits and vegetables are cordially invited to attend, and a good time is promised to all.

Two papers will be read, one on the culture of raspberries and blackberries, and the other on the culture of grapes, each to be followed by discussion.

The following is a list of the members, thus far enrolled, of the Lake City Horticultural Club:

Mr. and Mrs. J. M. Underwood, Mr. and Mrs. John Wear, Mr. and Mrs. O. P. Francisco, Rev. and Mrs. E. B. Chase, Mr. and Mrs. A. G. Ryther, Mr. and Mrs. Robert Buttermore, Mr. and Mrs. John Church, Miss A. Sargent, Miss Naomi K. Stevens, Mr. and Mrs. J. Cole Doughty, Mr. and Mrs. J. W. Kennedy, Mr. and Mrs. E. F. Jewell, Mr. and Mrs. Nels Anderson, Mr. and Mrs. George Phillips, Miss Buttermore, William Longsdorf, Thomas Lowry, S. L. Doughty, John Horrigan.—The Lake City Republican.

General Fruits.

WHAT FRUIT CAN OUR FARMERS MOST PROFITABLY PLANT?

E. H. S. DARTT, OWATONNA.

It is with a great deal of reluctance that I shall attempt to answer this question, for I know how fashionable it is in a meeting like this to say nice things in a very pleasant way to work up enthusiasm, create a little boom and have a good time; and the man is certainly indiscreet who will throw cold water and spoil the good time, or, at least, create a chill. But, some of you may know that I am a cold water man, a prohibitionist, accustomed to rough treatment, and that I expect to be punished for throwing cold water. I am not a non-resistant but believe in hitting back as often as opportunity and courage permits.

Not long ago I attended a horticultural meeting where farmers were roundly scored and even ridiculed for not having good gardens and plenty of fruit, so that they could furnish strawberries and cream for the great horticulturists who might feel inclined to rusticate. I was mad and wanted to hit back in defense of the poor farmer, for whom I have great sympathy, having been uncomfortably near that position myself; besides, I inherited from my father a disposition to always sympathise with the under dog. This may throw light on some of my strange freaks and help you to understand and excuse my present attitude.

Horticulturists as a rule are genuine philanthropists. They always tell the truth, but they are not sworn to tell the whole truth, and they seldom do it. They have noble objects in view in leaving unpleasant features in the background, for if brought prominently forward it would spoil the picture in Minnesota. They feel obliged to sugarcoat liberally, so as to make the medicine palatable. The result is that when a fellow has swallowed it and is tortured with griping pains, not hinted at by the doctors, he thinks he is sold and is liable to soliloquise in this way: "Wonder if those fellows know what they are talking about, or are they talking just for fun and to pave the way for some rascally tree agent to gull the people."

It seems to me that it would be far better for us to come square up to the scratch and tell the whole truth. Let us admit that our climate is not well suited to fruit growing; it is too cold in winter and too dry and hot in summer; and to make the business profitable

we must dive down deep into the study of adaptation; we must select the hardiest varieties, the most favorable localities, and secure the best management. We have the hardy varieties, but a large amount of trying and sifting is still necessary to determine which are best. On best localities there are well settled conclusions, and in regard to best management, the doctors disagree to some extent, but not seriously on main features. Now, if what I have said is true, then fruit-growing in Minnesota for profit is about as intricate and uncertain a business as a man can engage in, and none but those well informed in regard to nature's requirements and able to secure all the conditions above alluded to can reasonably hope for success in growing the standard apple.

Under these conditions I am asked to tell the farmers what to plant. If farmers were on a level in intelligence; wealth, and surroundings, my task would be easier; but they are not. Here is a man with a mortgaged farm and a sick wife; no one to do a chore out of doors but himself. To him I would say plant some currant bushes and some raspberries of a kind that bears well and never kills down; twelve crab apple trees of two or three of the best varieties; six native plum trees of good quality; six Duchess and two Hibernian apple trees. Plant in cultivated ground and take good care of them, even if obliged to work nights and Sundays to do it. If religiously inclined, work more nights and omit Sunday work. Cultivate thoroughly. Throw up a sharp mound of dirt a foot high around each tree in the fall to keep away mice, and tie cornstalks or lath around the bodies of trees to keep away rabbits and prevent sun-scald. If lath is used and is fitted down to the ground, the mound may be omitted—keep the lath on the year round. Mulch every fall with manure and cover evenly a circle six to eight feet across all around the tree. If manure is fine and rich, two or three inches in depth will do, if coarse and poor, four to six inches should be applied.

If trees are drifted under they must be shoveled out, otherwise they may be crushed by the settling drifts, especially if a hard crust is formed. Trees with bodies three or four feet high are much easier to protect from rabbits, snowdrifts and sun-scalds than those that limb down to the ground. If a tree agent comes around set the dog on him; then kill the dog for barking at strangers, and keep another pig. When the mortgage is paid, the buildings ample and in good repairs and the farm well stocked, then branch out in horticulture. Join the State Horticultural Society and attend all its meetings. Meet the tree agent with a smile and ask his forgiveness; invite him to your home and treat him kindly; but it will still be safest for you to "look a little out" as to what kind of horticultural medicine you swallow.

Here is another farmer in easy circumstances. Good farm well stocked, good buildings all complete, out of debt and money at interest. I would advise this man to double the poor man's list the first year and add a half doz. early grapes, and if he has grown children that will work, or if his wife loves outdoor exercise and will boss the garden, or if he himself is horticulturally inclined, then I would

say add more grapes, blackberries and a good sized patch of strawberries. But, if he has no taste for horticulture and must hire all work done, I would advise him to omit blackberries and strawberries; for ten chances to one neither the hired man nor any one else on the farm could manage the strawberry bed so as to make it either profitable or ornamental.

If this man has a good place for an orchard and he makes the best use of the light now before him, he can, probably, make more money from an orchard in southern Minnesota than from any other equal amount of expenditure on the farm. If his location is unfavorable, he should still have an orchard; he should abandon the idea of money making and plant for convenience, comfort and home adornment. He should study up on tree protection and distribute liberally through the orchard evergreen and other ornamental, not forgetting nut-bearing, trees suited to the climate. He should plant all kinds of fruit trees of value, that he thinks he can give adequate protection to. Even peaches may be grown, if he will lay down and cover then or build a suitable house over them for winter protection.

How far he will follow this line must be determined by the condition of his pocket book and his own taste; but, certainly, he can pursue it far enough at a moderate expense to create a little paradise all his own, and it is just possible it might be all the paradise he would ever see.

I would advise the growing of tree fruits by farmers in preference to small fruits for the following reasons: The work of growing trees is directly in his line, consisting of plowing, dragging, cultivating, hoeing and mulching. Most men prefer this kind of work rather than fussing with strawberries.

Almost the entire work of producing a crop of strawberries must be repeated each season, so that the loss of a crop, which is quite frequent with the farmer, means the loss of all this labor. Not so with the orchard; a failure of a crop means simply waiting another year and giving his trees proper care at an expense of about ten cents per tree for cultivating and mulching, during which time his trees are growing more rapidly than while producing crops. Then the results must be considered; a man may grow small fruits for ten years without any permanent improvement to the farm, but if he has cultivated fruit trees under the stimulus of wholesome medicine for that length of time, he has not only added to his own material wealth, but he has added beauty to the landscape and a source of great attraction to the farm; he has helped to untangle the intricate mazes of nature's requirements and he has added a new charm to life. He will enjoy exquisite pleasure in strolling in the orchard in springtime and sniffing the balmy breeze, scented anew from his blossoming trees; and in the fullness of his expanding soul he may exclaim, this is a grand old world. He will feel a consciousness of having acted well his part, and he will leave to posterity a heritage better than gold.

DISCUSSION.

Mrs. A. A. Kennedy: I have only an acre of ground in fruit, and I run the garden and the men the farm, and I pay the in-

terest on the farm and I pay a good many other things beside, and if I believed for one moment what Mr. Dartt here said about the horticultural society I would not stay in it another minute. (Laughter.)

Mr. M. Pearce: I do not feel like discouraging horticulture in Minnesota by any means. I think it is a very paying and satisfactory business. We can grow fruit here of all kinds, but it is a fact that some men cannot. A man that comes to Minnesota makes up his mind just what kind of a climate Minnesota has, winter and summer, and he can make up his mind that he has got to take every advantage of the climate. It is not every man that can do that. I will give you an illustration of this: I knew a man who had a small farm fifteen years ago; there was nothing on it. He was one of those men that could look ahead, had a mind of his own and knew just what he could do. He set out all kinds of fruit on his farm and took good care of it. He raised his crops besides, but he kept right on with his fruit, and it was a very short time until they had an abundance of fruit. Before that his children were not satisfied on the farm, they did not want to stay, but they had a beautiful home, plenty of fruit and they began to change their views. Some of those children grew up, were married and moved away, but they come home now every summer and are perfectly delighted with their old home; it is surrounded by shade trees, they have plenty of fruit, and everything is pleasant, and I have never seen a place that is so delightful. Now, gentlemen, with intelligence and industry there is no farm in Minnesota but what can be made a heavenly paradise, and I had rather be there than in any other place. It is my religion—perfect nature. I can study nature there.

Prof. W. W. Pendergast: I was going to ask Brother Dartt how it was that a man could cut off all hopes for a paradise beyond, but Mr. Pearce has answered that question. I see that he makes an idol of nature, and in that way cuts off hope for anything better hereafter, and I shall not have to call upon Mr. Dartt to answer that question, because it is sufficiently plain. (Laughter.)

Mr. Dartt: My paper is right exactly in that line. I do not know that my paper is understood. May be I better read some of it over again. (Laughter.) This last page is every bit of it in that line, encouraging fruit growing, encouraging the making of that paradise, because a man might perhaps never see any but the one he had made.

Mr. L. H. Wilcox: If that last page is so encouraging to apple growing and fruit growing I think we had better accept it as an offset to the pessimistic views Mr. Dartt has set forth in former years.

Mr. J. S. Harris: The paper read before us is an evidence that we live in a progressive age. Mr. Dartt is becoming converted to apple culture, and if he attends a few more meetings of the society, he will come out and say there is money in small fruit culture for every farmer. All of us men that have been through the mill and have had from twenty to forty years experience in Minnesota, believe it. We believe every farmer can grow his small fruits, but we hesitate a good deal when we advise them to put out an orchard, because we are not fully satisfied there are more than two or three varieties that will stand everything. Let us go on until we get Brother Dartt fully converted.

Mr. Dartt: I want to state, Mr. President, that there are evidences of this being a progressive age. Now, the fact that one individual is progressive is not evidence of the age; we have got to have the whole mass educated to a standard in order to call an age progressive. In this case I am happy to see indications of the fact that those members have progressed so much that they are able to appreciate my valuable instruction, but they have become educated up to it. (Laughter.)

Mr. Pearce: I say he has done more than any one man in the state in demonstrating that Minnesota is a good state for raising apples. He took from his orchard just 1,900 bushels of nice standard apples, and I said to myself, there is a future for apples in Minnesota.

Col. Stevens: Mr. Keel had 3,500 bushels; Mr. Dartt, 2,000; Mr. Somerville, 2,000 and Mr. Michenor about 2,500, so at least four farmers raised a good many apples in Minnesota, about 10,000 bushels.

RABBITS—I reported some years ago my success in preventing their depredations in the orchard by throwing down a few elm branches where they could eat the buds. This past winter a little pile of wheat, kept out on a knoll for quails, has been the nightly resort of the rabbits, and they have not barked a tree in the orchard. They herded so thickly in the cover near by that my neighbor's boys have shot eighteen there during the winter and sent them to the city markets.

OLIVER GIBBS, JR.

Secretary's Corner.

Can you use any letter heads, as shown in the March number? It will help us.

One hundred and ten additional names have been placed on our annual membership roll during the past month.

This office was moved March 1, as planned, to 207 Kasota Block. The new quarters are commodious and pleasant, as much so as was expected. The fast growing library fills about two-thirds the wall space.

Some of the pictures at our World's Fair horticultural exhibit adorn the walls, and the chairs used there have been added to the furnishings of the room. Altogether it is a very creditable home for the society and many of the members are finding their way here. All are welcome.

The state fair premium list for 1894 is now in press and copies will be sent at an early date to the members of this society. The premiums on horticultural products have been re-arranged, so that hereafter premiums will be paid only to producers—every article exhibited must have been produced by the exhibitor. The premiums on fruit have been about doubled, and considerably increased on flowers.

Every member should plan to send to the fair the choicest products of the orchard and garden, and, if possible, attend in person. You will gather inspiration there and our work will be greatly advanced. Please read the list carefully and see what you can exhibit.

PREMIUMS TO NEW MEMBERS.—The six valuable premiums, including the report for 1893 and the magazine for 1894, all for \$1.00, ought to place hundreds of new subscribers on our rolls this spring.

If each member would give a few minutes to this work amongst his neighbors our list could easily be doubled before the May issue. Have you noticed the very liberal offer of the six premiums, magazine and three back reports to any one sending three new subscribers?

It should be easy to secure members with all these inducements. Can you not devote a little time to the work or get some one else to do it—and so help advance the interests of the society? Circulars in any quantity will be furnished for distribution upon application, and a few sample copies of the magazine can be spared.

If new members prefer three back reports by express, they to pay the charges, they will be sent instead of one by mail postpaid, as offered.

THEY FEEL THE PRESSURE.—As the result of much indignant protest, the Western Passenger Association has changed the rule regarding the number of passengers requisite for securing one and one-third fare. The last rule placed the number at 250, and when the teachers met here there was much disgust when it was found that the number fell short of 250 patronizing Western Association roads. Many of the teachers had to pay full fare for the round trip. The horticulturists had the same experience, and the protests of these two bodies were taken up by the board of trade and the business union. The consequence is the number has been reduced to 100.—*Minneapolis Journal*.

THE PENNSYLVANIA HORTICULTURAL SOCIETY has concluded to rebuild Horticultural Hall, which was burnt down about a year ago. At the last meeting of the Society a resolution was adopted in favour of rebuilding the hall on the former site.

The money for the purpose of rebuilding will be raised among the members of the horticultural society, which includes in its rolls some of the wealthiest men in Philadelphia.

About \$30,000 has already been subscribed for the purpose, The Florists' Club have expressed their willingness to contribute \$1,000.

It is proposed to put up a building, which will be an ornament to Broad street.—*The Florists' Exchange*.

(Is there a hint here for us?—Sec'y).

ADDITIONS TO THE SOCIETY LIBRARY.—The following books have been added to the library since Feb. 1.:

Reports of Columbus, Ohio, Hort. Society for....	1887, 1889, 1890, 1892.
Journal, Columbus, Ohio, Hort. Society....	Dec., Mar. and June, 1893.
Reports, Georgia State Hort. Society.....	1892 and 1893.
Report, Florida State Hort. Society.....	1893.
Report, Illinois State Hort. Society.....	1893.
Report, New Jersey State Hort. Society.....	1894.
Report, Nebraska State Hort. Society.....	1893.
Report, Oregon State Board of Horticulture.....	1893.
Report of Farmers Institute, Ontario.....	1892.
Official Reports to Minnesota Board of World's Fair Managers,	
Donated by Supt. L. P. Hunt.	
Minnesoa Day at the World's Fair, donated by C. McC. Reeve.	
Reports of Minneapolis Park Board.....	1883-1893.
Report of Minneapolis Park Board, donated by F. H. Nutter...	1893.
Reports of Pennsylvania State Board of Agriculture for the	
years.....	1892 and 1893.
Reports of Pennsylvania State Horticultural Association for	
the years.....	1889, 1890, 1891, 1892 and 1893.

Your Corner.

(Here is a chance for you to talk back, briefly and concisely.)

The members for 1893 entitled to the Russian trees offered by me as premiums, who do not receive them by April 10, are requested to notify me, giving address and express office.—J. S. HARRIS, La Crescent.

Getting the report in monthly form I read much more of it than I ever did of the annual volumes.

Here is something tangible to the average person. You should reap a large increase in membership.

Do *not* cut the leaves for me. Sincerely, FRANK D. WILLIS.
ST. PAUL, March 21, 1894.

DEAR SIR:—As soon as the treasurer of our local horticultural society returns, we will send in the names of ten or twelve (perhaps more) members, and accompany each name with \$1.00, for membership in the Minnesota state society. And hereafter a membership in our society will mean a membership in your society. Yours truly,
WATERTOWN, S. D., March 12, 1894. G. C. JONES.

DEAR MR. LATHAM:—I am in receipt of the first two numbers of your Minnesota Horticulturist, and I want to congratulate you on their appearance, and on the valuable matter you have succeeded in getting into them. I believe it is a decided improvement over the annual volume method, and trust it may be a success in every way. Wishing you all the success possible in the venture, and assuring you that I am sure you deserve it, I am, cordially yours,

F. W. TAYLOR,
Secretary Nebraska State Hort. Soc'y.

LINCOLN, Neb., March 5, 1894.

I want to say just one word about the publication of the "Minnesota Horticulturist." I am *very much* pleased with it. It is a credit to you, and to the society, and for those who are new in the business I am inclined to think it better than to wait so long for the entire publication. I wish you success, and hope I may be able to help to increase the subscription to "The Minnesota Horticulturist."

Yours very truly, J. P. WEST,
Pres. Minnesota Bee-Keepers' Ass'n.

HASTINGS, Minn., March 3, 1894.

WINTERING ROSES—DEAR SIR:—I send you a branch of one of our H. P. roses that we have just taken up from its winter home. It seems to be in perfect condition and I hope we have solved the best method of caring for roses in the winter.

We put down leaves first, then the bush and then more leaves. On top of that we put a twelve inch board along the row, and over all a ridge of earth, Notwithstanding the warm and open winter we have had and the heavy rains, the moisture does not seem to have penetrated, and the leaves and everything are dry and in perfect condition. These bushes have kept very much better than those we had in the cellar.

Very truly yours,

LAKE CITY, Minn, March 17, 1894.

J. M. UNDERWOOD.

Dear MR. LATHAN:—

You have taken upon yourself a good deal of labor in getting out the paper, stimulating the formation of local societies, increasing the membership in the state society, etc., more, I fear, than you will have endurance to go on with alone, but the best wishes of all good members will go with you.

The only improvement I could suggest for the paper would be (what I presume you already have in view) to get into each issue as many practical, seasonable items as may be within your reach, in addition to the proceedings of the meetings, and that the members be invited to furnish all such matter of this kind as may occur to them from time to time.

In furtherance of this suggestion I enclose you two items from my own experience, which you can use at any time and in any way you think proper.

Yours truly,

RAMSEY, S. D., Mch 10, 1894.

OLIVER GIBBS, JR.

SPRAYING FOR ANTHRACNOSE—(Extract from a letter to Mr. A. H Brackett):—I cannot recommend anything better for anthracnose of the raspberry and blackberry than Bordeaux mixture. We have not made any experiments ourselves with these diseases, but experiments conducted in Ohio have shown that by the proper use of Bordeaux mixture, the disease can be largely prevented. The directions given by the Ohio station are as follows:

"The first application should be made early in the spring before the leaves open, at which time the spraying should be very thoroughly done. The second application should be made soon after the young canes appear above ground, and the spray directed to them alone. The third application is to be made in about two weeks from the date of the second, taking the same precaution to spray the young canes only. The fourth and last application for the season should be made just previous to the time of blooming, in the same manner as advised for the second and third sprayings. Raspberry leaves are very tender, and the mixture injures them slightly, but not enough to preclude its use, especially, if some care is taken to keep it off the leaves of the bearing canes. The leaves on the young shoots of the current season's growth are not so easily harmed, hence no pains need be taken to keep it off them."

Very truly,

B. T. GALLOWAY,

WASHINGTON, D. C.

Chief of Division.

Gleanings.

Success in gardening depends on anticipating by weeks and months the operations which are to be performed.

It is out of the Russians that the New Horticulture must come, even if the fruit is inferior, as the superior hardiness of both wood and leaf must be conceded.—B. Hathaway, in *The Michigan Farmer*.

Without exception the average number of tomatoes and the average weight of the product per plant was in direct ratio with the earliness of setting, a direct confirmation of results obtained last year.—Maine Exp. Station Report.

AMERICAN POMOLOGICAL SOCIETY. Hon. P. J. Breckmans, Augusta, Ga., President; Chas. L. Watrous, Des Moines, Iowa, First Vice-President; Geo. C. Brackett, Lawrence, Kansas, Secretary; Benj. J. Smith, Cambridge, Mass., Treasurer. Place of next meeting: San Francisco, Cal.

SOCIETY OF AMERICAN FLORISTS.—J. T. Anthony, Chicago, President; Robert Kift, Philadelphia, Vice-President; Wm. J. Stewart, 67 Bromfield St., Boston, Mass., Secretary; M. A. Hunt, Terre Haute, Ind., Treasurer. Place of tenth annual meeting: Atlantic, N. J., August, 1894.

AMERICAN SEED TRADE ASSOCIATION.—W. Atlee Burpee, President; D. I. Bushnell, First Vice-President; S. F. Leonard, Second Vice-President; A. L. Don, New York, Secretary and Treasurer. Place of twelfth annual meeting, Toronto, June, 1894. Applications for membership should be addressed to Wm. Meggatt, Chairman membership committee, Wethersfield, Conn.

THE AMERICAN ASSOCIATION OF NURSERYMEN.—President, Col. U. B. Pearsall, Ft. Scott, Kan.; First Vice-President, W. F. Heikes, Huntsville, Ala.; Secretary, Geo. C. Seager, Rochester, N. Y.; Treasurer, N. A. Whitney, Franklin Grove, Ill. Executive Committee: Irving Rouse, Rochester, N. Y.; W. J. Peters, Troy, O.; D. S. Lake, Shennandoah, Iowa. Place of next meeting, Niagara Falls; first Wednesday in June, 1894.

CURRENT WORMS—When these pests make their appearance they will first attack the gooseberries. Noticing this some years ago I applied a light solution of paris green—a small teaspoonful of a pailful of water giving them only a light sprinkling, and saw no more of the worms anywhere that year. Since then I have watched the gooseberries, and dealt with them the same way, the worms never reaching the currants at all.

OLIVER GIBBS, JR.

THE MINNESOTA HORTICULTURIST.

VOL. 22

MAY, 1894.

NO. 4

HOW MONEY IS MADE.

FARMERS WHO DIVERSIFY CROPS HAVE NO COMPLAINTS.

O. M. LORD, MINNESOTA CITY.

As I rarely write for publication, I hardly feel competent to discuss diversified farming in any new or interesting manner. The changes in this county have been very slow from wheat, wheat and barley to stock raising, dairying, fruit growing, etc. As for myself, I have grown no wheat or barley in twenty years, though my place is as well adapted to those grains as the average farm of the valley lands. I have found that for me small fruit growing has been the most pleasant and profitable, though I have, in connection with it, usually kept from five to ten cows, generally raising the calves till two years old. And I also have kept three or four mares, and sold the colts at two years old; also a limited number of hogs and a small flock of hens. The horses are needed for work, which, being light, interferes very little with raising colts. This has not been profitable for the last two years, as the county is overstocked with low-grade animals. The calves, hogs and poultry necessarily go with or depend, more or less, upon the keeping of cows. These matters in no way interfere with small fruit growing, and the manure made from the stock is a valuable addition to the success of the fruit. The stock occupies the time in winter, when the fruit industry is entirely idle, and the only rush or hurry with fruit work is in time of picking, which depends upon fair weather and gives ample time to attend to the cows night and morning. I rarely buy any feed except bran, and usually sell some hay and feed and all the oats and corn. I have not had less than fifty bushels of corn to the acre for several years; oats vary from thirty-five to fifty. For a series of years the hogs have rendered a good account. The hens have sometimes paid in market products, without fancy prices, three dollars a piece for the year, without counting what was used in the family.

In intimate connection with small fruits, bee-keeping is considered almost absolutely necessary. I have found this rather precarious, sometimes losing the bees, but often meeting with remarkable success.

In regard to the profit of small fruit growing: Where I am located, I have unusual facilities for railroad shipments; three prominent roads cross the farm, with a station very convenient. I

can ship in any direction, morning or evening. I have rarely known the market to be overstocked with first-class fruit, and I need not refer to special or general prices to show that the business, economically conducted, gives a fair return for amount invested and labor bestowed. Under the system pursued, the soil does not deteriorate, as with grain raising.

Without special care my blackberries have borne their usual crops for fifteen years. Raspberries should be renewed once in eight or ten years. Currants and grapes, it is well known, though needing care every year, stand for many years, and strawberries do best when new beds are planted yearly, and, though a good paying crop when they do well, are not as sure as the other fruits. But, taken together, failure does not as often occur in fruit raising as in grain raising; and I need not mention the results of failure in a grain crop—failure is too well known. But in comparison with the expense of high-priced labor, tools, etc., a diversified work will make the largest and most satisfactory return.

An itemized account of cost of production, of sales and returns of different products of the farm, is the only way to determine their relative profit. Probably, not one in fifty of average farmers can give any idea of the comparative value of different crops, when the total cost of production is to be included. I will try to illustrate by one example. One of my neighbors, with a farm of 200 acres, was impressed with the common opinion that all hand labor is a waste of time on the farm, and seemed to be satisfied with his work only when it was accomplished with the help of a team. He said: "I don't see how you can make it pay to putter around with strawberries and blackberries." Taking from my pocket a memorandum book and pencil, I said: "Let me show you some figures. There are ten acres of corn that yielded 1,000 bushels of ears, equivalent to 500 bushels shelled corn; without itemizing the cost, which most any one can do, the value in the crib is \$125."

"Yes," said he, "that was a fine crop, which I should think would pay you better than all the berries you have, to say nothing of the value of the fodder." I then referred him to the account of a small strawberry bed of fifty-four rods (2x27). The proceeds were 660 boxes, barely a medium yield. The cost of the corn (as the labor was all hired) without counting interest on the value of land or taxes was 16c per bushel, \$80; net, \$15. The itemized cost of the berries ready for market was \$26; net, \$40. As for the character of the labor, one must choose for himself. I prefer to diversify the work.
—*Minneapolis Journal*.

The new monthly, we understand, will take the place of the annual bound volumes, and is an advance movement. The Farmer gladly welcomes the *Minnesota Horticulturist*. It is in good hands and will become popular.—*Northwestern Farmer*.

Apples.

DISCUSSION.

(CONTINUED FROM PAGE 103, APRIL NO.)

WINDBREAKS.

Mr. B. Taylor: Now a word in regard to windbreaks. About thirty-six years ago I joined the church in regard to fruit and went to worshipping it. I selected a spot on the place where I lived at the time; I could see that in the spring the snow would remain there, and that it was surrounded with natural windbreaks. It was so well protected that I went to planting, and when my friend Jewell visited me he was as much pleased with the situation as I was, and he said that for either a nursery or orchard it was a perfect spot. I planted a great many trees and raised more or less fruit, but in that orchard, surrounded by a perfect windbreak, we do not now find any trees. We are still planting trees, but we plant them on a bluff 300 feet above the river, and we make no provision for a windbreak. Now, Brother Pearce, in regard to your idea that apple trees and other fruits acquire increased ability to hang on if exposed to the wind, that is law and gospel. Like ourselves, if we never moved we would cease to have power to live. We have our fruit right up where it is not quite as much exposed as on the prairie, but we have made no provision for protection against the wind. We plant rather close together. My orchard was formerly a nursery; just leaving certain trees standing when digging trees, leaving them standing sixteen to eighteen feet apart. Now, I have great faith in letting them grow in the nursery without transplanting, if it were possible. I think there is a good point in that; I believe a tree can be raised best right where it is to set. Mr. Underwood might not like my idea as a business idea.

DISTANCE APART.

Mr. Dartt: Did those trees ever crowd so you thought you were damaged by having them stand close together?

Mr. Taylor: They stood close together on one side of my house only, but the cyclone thinned that orchard. Six to seven hundred trees were entirely destroyed in as little as thirty seconds.

Prof. Green: Let us hear from Mr. Lyman.

Mr. H. M. Lyman: I have not had much experience in setting out an orchard. The first orchard was sixteen feet apart each way as they grew, but it was rather too close for some varieties; there are other varieties that spread out and require more room. I never had any experience with windbreaks.

A Voice: What variety of apples have you?

Mr. Lyman: I have Duchess, Wealthy and quite a number of seedlings. I have a seedling crab near the house; it spreads out and extends over thirty feet; about twenty years old from the seed. The apples are about twice as large as Transcendents. An orchard of that description needs to be planted about thirty feet apart, while other varieties of trees need to be but sixteen feet apart.

Mr. Dartt: What is that crab like?

Mr. Lyman: It is somewhat like the Transcendent. It blights a little. I have sold them generally for \$1.50 to \$1.75 per bushel. It commenced to bear about six years ago and it has borne not less than eight bushels each year since, and from that to fourteen and fifteen bushels.

Col. Stevens: Is your orchard in the Big Woods with a grove around it?

Mr. Lyman: It is exposed on all sides, and the Duchess I planted twenty years ago are nearly all alive, but on the low ground every one died out.

AIR DRAINAGE.

Mr. Dartt: That winds me up again, now I have a right to talk more. That is a splendid truth; we want to bring that in as a new feature in this discussion—that is, air drainage. The mention of the fact that his trees on the low ground had died out, while those on the high exposed ground lived, is an indication that the death blow was caused by want of air drainage, while those above were preserved by air drainage. I wrote a piece for you three or four years ago, and I think I alluded to the fact that trees down in a hollow would be quite sure to freeze out, while those on elevated ground would live. I have got some ground where the trees all died out. They were Duchess and some crabs of the best varieties that I thought best to set out at that time, but they have killed out entirely; and, so, in nearly every instance on low ground my trees killed out, and I have cleaned them all out, while on ground a little higher and where I have a windbreak, they are doing well. Now, the low ground and the absence of a windbreak have the same effect. They kill out on high ground unless they have a windbreak on the south side. In this line, I have a man chopping this winter to clean out a ravine extending from the orchard down to the creek bottom, maple and oak; he is cleaning that all out, chopping down young trees that we would naturally preserve; but he is cleaning that all out in order to create a current for the wind to blow through that orchard. That is a point that I think should be considered, and, of course, you can place as much dependence as you like upon my opinions, founded on this very "experience." (Laughter.)

Mr. Brackett: What is the character of the soil?

Mr. Dartt: That winds me up again. (Laughter.) I have nearly all kinds of soil and nearly all kinds of exposure. I have a regular black soil with a clay subsoil, and I have got some with a little sand mixed in it on clay subsoil. I have one place in my orchard where the railroad crosses the ravine, and there is a high embankment built up, and it creates a sort of a dam. All the trees that were set lower than that embankment have died out.

WINDBREAKS.

Mr. Wedge: I would like to have the society take a vote. I will make a motion that this society resolve that we are in favor of a windbreak of some kind on all sides of the orchard. I would like to see what proportion favor a windbreak on all sides of the orchard.

Mr. Dratt: I want to amend the motion. I want to amend by saying that the society is in favor of a windbreak on the south side of the orchard. I am in favor of a windbreak, but I do not want it all around, so I would be obliged to vote against his motion, when, at the same time, I am in favor of part of it.

Mr. Toole: I would advise you to be rather slow in making a positive recommendation of this kind. You might vote it wholly down, and it hardly comports with the dignity of this society to be changing continually. You may, probably, come to where we came in Wisconsin. We cannot take a positive stand one way or another unless we take a chapter to explain certain conditions.

Mr. C. Hawkinson: I think it depends upon the location.

Mr. P. M. Perry: I have an experimental orchard. I have a windbreak on the south and north of natural timber. I think it is a damage for quite a distance into the orchard. The trees do not bear anywhere near as they would without a windbreak. I have a south and a north slope. The trees on the south slope have all died out with one exception, and that is the Martha. The Martha is the tree to take the place of the Transcendent, and it is a regular bearer. On the north slope, the trees are healthy right in the same row with those on the south slope, which have nearly all died out in six years.

Mr. Somerville: I do not think it would be proper to take a vote on this question. For, wherever we live where the nature of the country is such that the wind is already broken up, and considerably broken up, there we are not bothered with those hard winds; but in our part of the state a different treatment is required all the time and for every kind of tree there; here it is more natural for a tree to grow, whether protected by a windbreak or not. You go out in Brown, Cottonwood and those counties west; there we could not raise a Transcendent crab without a windbreak. I have never advocated the idea once that it was any advantage to have a windbreak right near a tree for the purpose of keeping the fruit on, but I think it would be utterly impossible to go out on the bleak prairie and set out trees without any protection around them and ever expect to get any fruit. It might not be advisable to have a windbreak all around the orchard, but it is absolutely necessary out on the prairie, and, in my opinion, it is the only successful way an orchard can be raised on the open prairie. But I do not think it would be well to take a decisive vote either one way or the other, because different localities require different treatment. That would be my opinion; it would not be prudent to take a vote on it, because there are many opposed to it; but out on the prairie it is absolutely necessary.

Col. Stevens: Where I was brought up in southern Wisconsin, known as the "lead mines," I remember a great many years ago (we were young then) there came up a "norther" one time; it was on the

prairie. The orchard protected by the windbreak, although icy, was not hurt at all, while in the orchard away from the windbreak the trees all died out. That is the effect of the windbreak we have heard about.

Mr. Harris: I do not think it is profitable for us to take a vote on the motion that was made. The views and experiences of the members will all come out in print anyway, and as a society we do not want to take a decided position either way.

Mr. Dartt: I have not much to say, and I am going to try to talk very fast, but I want a windbreak for two reasons; to prevent the effects of the sun, and to prevent the apples from being blown off. Under some conditions the windbreak is absolutely necessary. If a windbreak is necessary on the broad prairie, it is necessary here; we have winds here that are just as hard as those on the prairie.

DISTANCE APART, ETC.

Mr. Brackett: Do I understand that apple trees are short-lived in this part of the country? In that case would it not be better to plant them closer together?

Mr. Brand: I do not want that idea to go out that apple trees are short-lived. If we plant the right varieties of trees and take care of them they will live, and live long. We have trees in our county that have been planted more than thirty years, that a year ago last summer produced more than fourteen bushels to a tree, and they are without any kind of windbreak and stand twenty-five feet or more apart. I do not think it is well to advise near planting with the idea in view that our trees are going to die out, or, if not, that we are going to cut them out. I have had a good deal of experience in cutting out trees and I hate to do it. We leave it too long; we let it go until the injury is done. I planted my Duchess, a good many of them, only twelve to fourteen feet apart, and some a little closer. They bore when they were seven to eight years old, and I thought like this, perhaps next year they will do better, and I put it off another year, and that year I would put it off another year, until the trees are now nineteen years old. Three years ago I cut some of them out; I took out one whole row, and in other places I thinned them out, and last summer I cut down a good many trees that were nineteen years old, and good healthy trees, so as to leave them twenty-four feet apart. Mr. Gould saw the trees after I had cut them down. If you undertake to plant close, you will not thin out until it is too late.

Mr. H. L. Crane: What kind of cultivation did those trees have that lived thirty years?

Mr. Brand: They were well cultivated the first five years after they were planted. In the fall they were banked up with earth, and we made hay ropes and wound them. At the end of five years, the former owner sold the farm and they received cultivation most of the time, with the exception of two or three years; the last four or five years the land has been in grass, until a year ago last summer. The land has been cultivated three-fourths of the time, perhaps, and one-fourth of the time was in grass.

Mr. Dartt: How much ground does the orchard cover—those trees that lived thirty years?

Mr. Brand: There are only seven trees remaining of a large orchard. That is four miles south of me.

Mr. Dartt: What has been the profit in your orchard, how much per tree up to the time you cut them out?

Mr. Brand: My own orchard has averaged one bushel.

Mr. Dartt: A tree that does not spread its branches more than four or five feet ought to bear more than a bushel.

Mr. Brand: Well, mine didn't.

Mr. Dartt: Those orchards that were closely planted paid for themselves before they had to be cut out.

TREES ON THEIR OWN ROOTS.

Mr. J. A. Sampson: I always feel interested in the culture of apples; I am very fond of fruit anyway. One of the great difficulties in planting apple trees is the lack of faith. I wish to bring up the subject of trees on their own roots, whether they can be propagated and made to be longer-lived if on their own roots than if grafted.

Mr. Brackett: I wish something would be brought out in regard to the boxing of trees, and whether it is necessary to take the boxes away every spring. Either boxing or wrapping with cloth.

Mr. Harris: I think I will say a word in reply to Mr. Sampson's question. It is a lamentable fact that in Minnesota trees are very short-lived; a great many die within three years after they come out of the nursery. I do not consider a tree in good condition if it will live thirty years; I do not believe in old trees. Down East they believe an orchard is worth a good deal more from eight to twenty years old, and that it will pay better to put out a new orchard and cut out the old. Just keep an orchard while it will bear the finest fruit and have a new one coming on. It is a lamentable fact that not over one in fifty trees that are sold by nurserymen or their agents ever lives to bear a single specimen of fruit. I do not believe that ought to be so. If the people become educated so they will know how to take care of trees, and the trees perish in that way, we ought to have a law in Minnesota that would put the men that sold those trees behind the bars at Stillwater.

SHADING FROM THE SUN.

Mr. Taylor: I think I can say something that the members can take home. I love to eat some nicely ripened Fameuse apples in the fall. I had a tree that was planted on the north side of the building I used in wintering bees. That was a south windbreak, and I do not raise my hand against that. This tree was shaded more than many others, and after a while the others killed out, but this one flourished and grew; but from ten o'clock in the day, or a little earlier, it was shaded by a little building near by. A fire burned up the building and the tree died down to the ground, but it grew up again and commenced bearing, and I knew I could raise apples but I must have shade on the south side. That Fameuse I must keep to raise good apples as long as I live, and I have made a shelter of boards so the sun cannot shine on it for four or five hours during the day. I know you can raise tender fruits that way, and I know those of you who will try the experiment will like it.

PROTECTION TO TREE TRUNKS.

President Underwood: The question was asked as to the protection of trees, by boxing or wrapping, and banking up with earth. We have just a few moments to give to that; just a minute a piece.

Prof. Green: I believe in protection in some way; it is a very important matter. It comes to me once in a while like this: A young man at the school told me he had some Duchess apple trees that were so loaded with fruit that they broke off. They were sun-scalded, and a tree finally got so weak it tumbled over. That can be prevented by banking. As to the necessity for boxing, I think in good locations there is no necessity for boxing. In the Red River Valley or in Otter Tail county, I would box them. There is not a tree growing in Minnesota but what ought to be protected until it gets pretty far along. What that protection should consist of, I cannot say. Newspaper or building paper is good. I have used this summer wire mosquito netting. I am also using a thin veneer. I soak it in water over night, and the next day it will bend very readily, and I bend it right around the tree. A hay rope or corn stalks will also answer the purpose very well. I like this wood veneer because it protects the tree against rabbits. We do not take them away in the summer; we leave them on all summer; we leave them on three or four years.

Mr. Brackett: In boxing trees, do you fill the boxes with dirt?

Prof. Green: I think it is desirable to fill the boxes with dirt.

Mr. Brackett: How do you put on that veneer, and where can it be obtained?

Prof. Green: I soak these little veneers in water over night, and then bend it around the tree and fasten it with wire at the top and bottom. It is a very good protection. I got my supply from St. Louis. They are extremely cheap.

Mr. Wedge: At about what age does the tree cease to need protection?

Prof. Green: When it can shade itself.

Mr. Z. K. Jewett: In our locality they use lath; they put it together with wire twisted together, using three or four laths, according to the size of the tree, and wrap them right around. If the tree is high, the whole length is used. That will keep the rabbits out.

Prof. Hansen: At the Iowa meeting a number gave their opinion on that subject, and some had found that lath intertwined with wire was not a good plan, but some used wire screening and found it to be the best method they had used yet; some even say it prevents sun scald. It is a good protection against enemies of any kind, and it will stay there as long as there is any need for protection.

Mr. Aiken: I used almost every kind of protection I had ever heard of, and I found they were injured in every way, until about six or eight years ago I heard about this wire screening. I had a lot of old doors and windows which I cut up and put the screening on from the bottom of the tree up to protect them from rabbits and mice, and I left that right on during the whole season; and some remained there over six years, summer and winter, and the trees were

protected from the sun, from borers, rabbits and everything else almost. I consider it gives the most perfect protection of everything I have ever used.

Mr. Harris: I do not believe a tree can become too old to be benefitted by winter protection. A single sheet of paper, wire screening, these veneers and, as good as anything, white cotton cloth. White is a splendid protection against the sun, but I do not believe that sun scald will take place with that wire screening, because the rays of the sun in striking that tree are somewhat broken up. Burlap is as good as anything in the winter. I believe the trunk of the tree would be benefitted by being protected every winter. I used to protect them up to the branches every winter, and when I quit that they died to the ground.

Mr. C. G. Patten: Some one suggested the use of hay or oat straw, which is very good and is somewhat easily to be had. I would also suggest the use of cornstalks, which almost every farmer has. I think they are superior to almost every kind of protection that has been mentioned here. It is well known that when the tree has attained any size it is quite as necessary to protect the forks of the tree as it is to protect the body, and with a little twine the stalks can be drawn up into the forks of the tree, which cannot be done with wire screening; and from the cheapness of the material I think it should commend itself to every farmer throughout the country. I would not let it remain throughout the summer; I would take it off every spring.

Prof. Green: It is a good idea to tie a bunch of hay right in the fork of the tree to protect the crotch of the tree. We use cornstalks quite a little. I think a good way is to use something, like these veneers, that will protect from mice and from sun scald, and then protect the crotch of the tree with hay or straw, and then let it stay right there during the summer.

Mr. Patten: My idea was to use the cornstalks in connection with the veneer.

Mr. Taylor: You take that veneer and protect your trees with it and it will do splendidly as long as the trunk of your trees are smooth and straight, but, I think, take it all round, you will find nothing better than paper, just common wrapping paper. Rag paper is the best; put it on when it is a little damp. We put it in the cellar for a night or two until it is quite pliable, and you can put it on any tree, no matter how crooked it is. Even common newspaper will do very well.

Pres. Underwood: Does it make any difference about the politics of the paper?

Mr. Taylor: Yes, sir; I never use a Democratic or Republican paper. (Laughter.)

Mr. Dartt: This paper is put on for the purpose of prohibiting, and nothing will do but a straight out Prohibition paper. (Laughter.)

Pres. Underwood: Perhaps we have discussed this matter of protection as long as it is profitable so far as the time is concerned, and from all the good points brought out in this discussion, I think it is the decided opinion that it is advisable and profitable to protect in some way.

General Fruits.

MY ENDEAVORS TO RAISE FRUIT IN MINNESOTA.

D. F. AKIN, FARMINGTON.

Arriving here on the first boat in the spring of 1856, fresh and green from one of the best fruit-growing regions of eastern New York, where fruit is a ration every day, can any one wonder that fruit culture would be looked after with care and perseverance, especially as none could be obtained at that time from any other place with any facility?

In walking over the country we found strawberry vines, blackberry vines, red and black raspberry vines, wild apple trees, thorn apple trees, several varieties of cherry trees, plum trees, grape vines, currant bushes, cranberry vines, blackhaw trees and elder bushes, all looking healthy, vigorous and thrifty, planted and cared for by nature alone. To a casual observer this list of fruits and berries would be satisfactory, but to a more critical lover of fruits and berries, there is a lack of goodness which they would naturally think could be supplied by intelligent direction and care; and that where the wild fruit grew so spontaneously, tame fruits of the same kinds would flourish.

As soon as I decided where to locate I sent for cuttings of tame currants and set them out; all of them lived, and those old roots are still giving us a good supply of that fruit. This same year I planted a few apple seeds that grew, but the trees did not survive the first winter—but exploded an old idea that apple seeds have to be frozen before they will grow; these were taken fresh from the apple, planted and grew. A few years after, I sent for some tame grape vines and cherry trees, and planted them. All made a fair growth the first season; none except two grape vines survived the winter—they were not protected by covering. These two grape vines are still wintering without any protection and giving good annual crops. I think they are wild grapes, being very foxy; but they are four times as large as the native wild grapes are here, and by that much an acquisition.

My next move was to improve the native plum. With this object in view I marked the trees that bore the best ones and set them on land where I could cultivate them; and it certainly improved them, but not enough to pay for the trouble—they were not equal to the tame plums. I must get scions of the tame plum and graft in the wild; this done, the grafts grew, some of them four feet in length and one inch in diameter the first season. The next spring some of them were covered with bloom, but none lived till the second winter. This finished my endeavors to raise tame plums, except within a few years. Lately, I have set several tame plum trees that have wintered without injury, and have also one seedling tree four years

old from a large plum bought in the city, that winters without protection, from which I expect a beauty.

Every year I plant apple seed; as yet none have wintered.

My next hobby was to raise pears by grafting on the thorn apple. The pear grafts were sent for without any thought of hardiness, and duly set. Many of the grafts made a fine growth and lived through the first winter, but none through the second. I also tried the pear and the Talman Sweet apple, grafted on the native wild apple. The pear grafts did not live as long as those did on the thorn apple; the Talman Sweet grafts lived through two winters, and the third season put out some blossoms and died. The wood of the stock and graft did not unite. These failures took the novelty out of pear culture; still when I bought apple trees again, I must try a few pear trees. One of them has lived since eighteen hundred and seventy one—that is, the roots. The top has never attained much size, often killing back to the snow line and never giving any fruit. Besides this tree, I have three varieties of pears grafted on a thorn apple tree, that show a good healthy growth. If they succeed, as they now promise, pears may yet be raised here.

All those years, from 1856 to 1863, apple culture here, where tried, had been nearly a failure, and only a few trees had given any fruit. In the fall of 1863, I ordered sixty-eight apple trees, twenty different varieties, and in the spring of 1864 set them on a piece of prairie that had been cultivated several years. It might be in place here to say that the location of these trees and my orchard is on what is called high prairie, that is, about eighty feet above the low ground half a mile away that surrounds it on three sides—no land as high near it except a ridge about eighty rods to the north, which is fifteen feet higher. It slopes slightly to the east. These trees were kept clean, and a few of them bore fruit, a Greening, Price Sweet, Red Astrachan and two Siberian crabs. None of this lot of trees are alive, but some of the sprouts are still growing.

In my next lot of trees, there were some Duchess, Transcendent and Hislop that have done well and have given good crops for the last fifteen years and are a fair success, except that the Transcendents have blighted badly; however, they are from eight to twelve inches in diameter. As soon as these commenced bearing, I planted a large quantity of seed, made 400 root-grafts and bought enough more to make 1500 in all. I set them out in the spring of 1871, and with much care have now living half the number, or 750 trees, and over 200 in bearing; some years receiving from the sale of their product \$150.

It might be of interest and may be of profit to inexperienced beginners in fruit culture for me to emphasize the statement that I have found it impossible to grow fruit trees and any kind of animal on the same land at the same time, not even a mouse, rabbit or pocket gopher; they will kill the trees. The best protection for the trees against these pests is kill the gophers by putting a piece of poisoned apple in their hole where their freshest work shows; for mice and rabbits, take the wire screens from old doors, cut it into strips two and a half feet long and wide enough to encircle the tree, put it around the tree from the ground up and with a pressure of

the hands fasten it together. This will protect your trees not only from mice and rabbits, but from sun-scald and borers, and will do no harm if left there.

Having a good many seedling wild crab trees about my orchard, I commenced grafting them with standard apples. In 1871, I put in some grafts from a Tetofsky that had not fruited, and the graft bore fruit two years before the parent tree and continued in bearing till 1893, when the graft and most of the tree died from blight. Other varieties have been grafted on the wild crab. No other variety tried, except the Duchess, has lived and borne fruit. Whoever has the wild crab trees can, by grafting them with the Tetofsky, have a supply of that fruit in a few years. In setting out an orchard I have always made a plat of it with the name of each variety written at the foot denoting the tree; if that tree died from any cause, another was put in its place and with the cause of the failure written on the plat. This gives a history of the orchard with the success and failures. In this way I have tried over 100 varieties that have not withstood the climate, besides a great many seedlings. The greatest cause of so many failures appears to me to be the extreme dry falls and winters, often noting that after such seasons came the greatest number of failures. My reason for these failures is, that in those seasons the roots cannot obtain enough moisture to supply the evaporation going on all of the time through the buds and branches; and the reason some varieties can stand these drouths is, they do not require so much moisture.

Among the seedlings that have fruited with me, one gave a nice apple at nine years old, that kept sound and crisp till the next season's apples were well developed, but the winter of '84 and '85 nearly killed the tree. Some sprouts from it have grown to bearing size, and last spring it put out some blossoms but did not mature any apples.

Another seedling of the planting of 1870 has stood without a bud or branch being killed by all the climate changes, giving promise of a good standard apple when it bears. Another seedling commenced bearing at six years old and has given a good crop six years in succession without a bud being affected by the climate, and only a few signs of blight, although it stands within thirty feet of a Transcendent tree in the last stages of life from blight.

From the great number of seed planted, I have but twelve varieties that have borne fruit that are hardy so far and give promise of remaining so.

Among my other adventures in raising apples I have tried planting seed from the native crab, and, as soon as these seedlings bore, planted their seed. In this way, from the third generation I have eight beautiful, hardy trees that are not in the least like the parent tree in trunk, branch, leaf, blossom or fruit. All of these except one give early summer fruit, while the parent bears winter fruit. No doubt the change is caused by hybridization; still, these changes are novel and very interesting. Now I am planting the seeds from these eight trees to see what fruit their progeny will bear.

Having given an outline of my endeavors to raise fruit in Minnesota, the task to me seems incomplete unless some of the results

of these endeavors are given. All small fruits can be raised in any quantity that a person has capacity for planting and caring for, tame plums and pears are a complete failure, tame cherries the birds take before they are ripe, tame grapes are a grand success if taken care of, apples can be raised by selecting hardy varieties. I will name some apples that have fruited on my grounds: Hebron, Minnesota seedling, Haas, Duchess, Red and White Astrachan, Wealthy, Fameuse, Alexander, Mother, Price's Sweet, Rock, Gilliflower, Beachers' Sweet, Malakoff, Queen's Choice, Transcendent, Hyslop, Sweet Winter crab, and many seedlings.

One noteworthy fact about fruit culture is that fruit grown in Minnesota surpasses in flavor and delicacy of taste that produced in any other state.

DISCUSSION.

Mr. M. C. Bunnell: Do you consider the Soulard crab a good variety to plant?

Mr. D. F. Aiken: It depends upon what you want to use it for; if you want to eat it from the hand it is no good, but if you want to make quince sauce it is the best you can raise in Minnesota.

Col. J. H. Stevens: The Soulard seedling was propagated near Galena by a man of that name. The apple was raised all over the country for the purpose of taking the place of the quince. It has all the qualities of the quince when preserved—hence, its popularity. It is the pure crab originated from its parent, the wild crab, on the prairies of Illinois.

Mr. C. G. Patten (Iowa): What size have you obtained from the seedling wild crabs you have produced?

Mr. Aiken: You will understand that these wild crabs will bear when four or five years old from the seed, so that the third generation only took ten years. These eight trees are now probably from four to six inches through the stem, and the trees have the most beautiful tops imaginable. They bear fruit, and the fruit from seven of them is as crabby as that from the parent stock; but there is one of them that nearly resembles the Hyslop. I do not know whether they were hybridized. The apple from one of these trees is far ahead of the Hyslop; it is not quite as good a keeper as the Hyslop, and has not the bloom on it that the Hyslop has; it is streaked red. The rest of the apples are a light red—you may say streaked.

Mr. C. Wedge: Does this tree show any signs of its parentage?

Mr. Aiken: Not in the least. Nobody could say they were from the seed of the wild crab stock.

Mr. Patten: How large are the apples?

Mr. Aiken: Seven of them have an apple smaller than the wild crab, the other nearly the size of the Hyslop, perhaps a little larger. This year that tree gave us about four bushels of apples. The others are very shy bearers.

President Underwood: The seven bear fruit about the size of the Siberian?

Mr. Aiken: It is rather peculiar with those seven; they are almost exactly alike. The eighth is a different variety entirely and apparently seems to be taken from the Hyslop.

FRUIT BLOSSOMS.

O. F. BRAND, FARIBAULT.

A valuable lesson may be drawn from the very limited number and small size of fruit blossoms, as seen in the vicinity of Faribault in 1893.

A trip to the World's Fair terminated my observations on May 30th. Our spring was wet and cold, consequently late. Grass was fourteen days later than usual. The third day of April was warm—the first and only warm day I have recorded up to May 21st. On this date the mercury rose to 80° above, followed by a thunder storm at night, shifting the wind to the north, with a temperature on the 22d of 46° above.

On April 19th we had a heavy fall of snow, which drifted to a depth of six feet; another light snow storm April 26th. On May 5th a drift in front of the house—in the sun and on the south side of a hill—was from twelve to eighteen inches deep, and a great many banks were still to be seen in the distance.

The first plum blossoms were seen May 26th; the first Duchess apple blossoms May 28th. Blossoms on a number of trees were seen May 29th, and still more May 30th. These trees were from nineteen to twenty-six years old. No blossoms were seen on about 300 trees in a six-year-old Duchess orchard. There were but few Duchess blossoms, and they small and weak. No Peerless blossoms were seen May 30th, although a few were, probably, open on the 31st or June 1st. No Transcendent blossoms of any account were seen. The Simmons crab, a very early variety, bloomed very full; the blossoms were small, not nearly as large as in 1892.

Not being able to see the bloom season through, I can now only speak of the results. Among fully 500 Duchess orchard trees, there was not one-half bushel of good apples. I think there were not over two bushels of Duchess apples all together, and they mostly very small and inferior. One Peerless tree bore almost as many perfect apples as my entire Duchess orchard.

Although I have referred briefly to climatic conditions before the blossoming period, I don't think it had much to do with the general fruit failure. I am inclined to attribute it to the injury done to the foliage of the trees between the 11th and 16th of June, 1892, an injury that prevented them from performing their usual function.

FRUITS IN THE RED RIVER VALLEY.

O. J. HAGEN, HENDRUM.

As I have read papers and reports upon the different kinds of fruits and fruit trees for the North and Northwest, I see a good many are selected from the central and southeastern part of Russia, and a few, I find, from St. Petersburg. As I am a native of Norway, I know that, to some extent, cultivated cherries and apples and raspberries, both red and black, grow well there. I lived in the central part of Norway. Although the climate was milder there than in Minnesota—though the winters were equally as long—they matured currants and gooseberries to perfection; they were never known to be injured by anything: but fruit culture was not, as far as I know, carried to such an extent as in some places in this country. But fruit raising could be carried on more successfully there, if they only knew enough to do it.

I should like to find out if any fruits have ever been brought over from there or from the northern part of Norway and Sweden. Sweden is a much colder country than Norway, except, it may be, a few places inland.

I am not old in experiment with the different emergencies a man is apt to come into in life. I had last summer a visit of the so-called currant bug, or the four-lined leaf bug. I have about 400 currants and gooseberries, with which I have had good success for the last five years, till this year. They showed no signs of sickness till these bugs nearly destroyed them this year. I gathered hardly one bushel of berries from the whole lot. They seemed not to hurt the blooms so much as the leaves and the new shoots. The bushes seemed to revive some after the berries were taken off, but the berries were small and hardly worth picking.

The Red Dutch seemed to stand the ravages the best. The Lee's Prolific was terribly damaged, which kind has been the heaviest in bearing fruit and been of rampant growth. The Fay's has not done well with me; it seems to do best on rather soft and low land, as does the Lee's. I also have the Victoria and Versailles, but the last named only three years old yet.

Last year I planted out about 250 more Victoria, 100 Red Dutch, 100 White Grape, 100 more Lee's Prolific, 50 Long Bunch Holland, 50 Black Naples currants, and 150 Houghton and 10 Triumph gooseberries. Next spring I will try a few Prince Albert and Stewart's, if I can get them at one place. Smith's Improved I have had no success with at all; had only one good crop from them, and this year they were mostly destroyed by these bugs. My new plantation is about one and one-half miles from the old one.

My Early Richmond cherries were badly hampered by the snow last winter, and from freezing and thawing, so they did not show any fruit last summer. I should like to know of any other hardier kinds. Of plums, I planted last year ten Desota and three Forest Garden. They look fine yet, and the summer was both hot and dry, and the whole fall was dry; they had no watering, but were mulched and cultivated. Fruit is scarce with us farmers out west, and one that knew how to grow berries would be better paid here

than anywhere else. This great Dakota territory is open for fruit in whatever shape it comes, and lots of it is used annually. It is a wonder to me that where fruit is raised in a favorable climate, they don't abandon wheat raising and go for fruit. True, it at first would take time and money to accomplish that, but in small fruits it would not take long. The trouble with this valley is it needs drainage, and in course of overflow, it is bad to work at the proper times; but some of this country is dry enough as soon as snow is off.

MINNESOTA SEEDLINGS AND NEW FRUITS FOR 1893.

J. S. HARRIS, LA CRESCENT.

Owing to the very general light fruit crop of the year, your committee did not think it advisable to make any extended surveys in search of new seedling apples or other fruits, or to visit trees that have been located in our reports of previous years; and, therefore, have only made such observations as we could without expense to the society, and sought for such information as could be gained through correspondence.

During the year six varieties of the apple and one hybrid Siberian of Minnesota origin have come to our notice. First.—On May 3d we received samples of fruit and wood of a seedling sweet apple from F. K. Page, of Witoka, Minn. Size of fruit, 4 to 5 by our scale; form, round-conical; color, deep yellow ground with brownish-red on sun side, striped with carmine red, and showing through the colors numerous gray and brown dots: flesh yellow, fine-grained, firm; flavor sweet, good; season, late winter or spring. The tree came up beside the road and is a chance seedling. The wood was in perfect condition.

Second.—Lenn's seedlings, Nos. 1, 2 and 3. No. 1.—Size 6; form, roundish oblique; color, yellow, striped red, splashed crimson; flesh, yellow, a little coarse; flavor, pleasant subacid; season, two to three weeks later than Oldenburg; origin, Houston County, Minn., from seed of Oldenburg.

Lenn's No. 2. Size 5; form, flattish round, slightly angular; color, greenish yellow, mostly covered with red on the sun side, blotched with deeper red and thickly sprinkled with grayish dots under the skin; flesh, yellow, fine-grained, juicy, subacid, good; season, October and November; origin, Houston County, from seed of Oldenburg.

Lenn's No. 3. Size 3; form, roundish inclining to oval; color, yellow and red striped; flesh, medium fine; flavor, pleasant acid; season, October; origin, same as Nos. 1 and 2.

Sandrock Sweet.—From Honey Creek; is reported as being very hardy; tree, 28 years old; fruit, medium size, and a long keeper.

Day's Seedling.—Farmington; size 4; form, regular, smooth, roundish, flattened at the base; color, light yellow, striped with bright red; flesh yellowish, fine-grained, juicy, pleasant acid; stem, medium long, slender; season, January; tree 16 years old, vigorous and healthy.

Aiken's Hybrid.—Size about same as Transcendent; form, smooth, round; color, yellow with blush on sun side; stem, long, slender; flesh, yellowish, fine-grained, pleasant acid, slightly subacid; season,

early September. The tree is reported as hardy and a regular and abundant bearer; originated by D. F. Akin, Farmington, Minn. It is one of the best of this class.

Through correspondence we learn that most of the seedlings heretofore reported that have come to our notice since the disastrous winter of 1884-5 did not receive any injury by the severity of last winter, or at least such of them as are being propagated at the experiment station. We are, as far as possible, securing a few scions of every new seedling that shows any promise of value, and making of them from six to twenty root grafts, with the design of planting two trees of each in our experimental orchard; and expect to place the remainder for testing in some of our society's trial stations or with reliable orchardists, except where the originators or owners place them under restrictions. This method will give new varieties a more thorough test, in widely different localities; their merits will be more generally known before they are propagated for sale, and the facility for the rapid propagation and distribution of such as have real merit will be greatly increased.

We secured scions last spring for this purpose of some thirty varieties, in addition to about twenty received one year earlier. We can hardly expect that any considerable number of them will prove entirely hardy and otherwise desirable, but the finding out of such as are tender and undesirable before they are propagated and offered for sale will prove of great advantage to our orchardists and farmers.

Native Plums.—At the Southern Minnesota Fair, held at Rochester the last week in August, there was a very creditable exhibit of this fruit. A variety shown by F. J. Stoppel was the finest in appearance of all the new varieties that came to our notice during the season. The fruit is large and oval in form; color orange, mostly covered with mottled red; suture on one side distinct and deeper red; stem one-half inch long, set in a small, regular cavity; color of flesh orange; of good consistency; flavor good; skin rather thick; stone medium large—a cling. We visited the trees and found them strong, upright growers and well laden with fruit, and were informed by Mr. Stoppel that they are regular, annual bearers, never failing to give a good crop, even when other varieties fail. We were told that the fruit is very popular in the Rochester market, and this year brought \$1.00 per peck.

We also received samples by mail, of varieties from R. C. Keel, Rochester; Dewain Cook, Windom; J. G. Johnson, Gossen; P. Klesan, Starbuck; Mrs. Alfred S. Grant, Walcott; Wm. Oxford, Freeburg; H. Knudson, Springfield; and some others that had no mark to tell where they came from. Unfortunately, at the time most of them were sent we were at the World's Fair or out looking after fruit to send there, so that when we got around to examine the fruit most of it was past the condition for judging its merits. We acknowledge our obligations to the parties who sent them, and regret that we are not able to describe and report upon each variety separately.

The variety from Mr. Oxford was very large and the earliest large plums we have seen. One of the varieties from Mrs. Grant was of a

clear yellow color, covered with a whitish bloom; flesh yellow; flavor fine; season, about September 1st.

At the World's Fair we saw several varieties that were sent down by Joshua Allyn of Red Wing. One of them was a large round plum of superior quality; color pale yellow, with blush on sun side; flavor very good; stem not over thick; flesh meaty; pit, medium, thick and round.

The Cotterell plum of O. M. Lord of Minnesota City has done remarkably well the last season, and bids fair to become one of our most reliable varieties.

Believing it to be a wise policy for this society to search out and locate all seedlings and new fruits that have their origin in this state, we recommend that the work be continued.

GENERAL FRUITS.

FIRST CONGRESSIONAL DISTRICT.

C. THEILMANN, THEILMANTON.

I am sorry that I cannot make a good report for this vicinity. The apple crop was very small, which could hardly be expected otherwise as many trees had no blossoms, or very few, with the exceptions of some Duchess and Transcendents, which here and there bore a little fruit. Also a few apples were found on the Wealthy and Whitney No. 20, and on some scattering Minnesota seedlings.

The promising Laguna seedling tree had but four apples, of which only one was perfect; but the tree is perfectly sound and healthy so far. Mr. Laguna propagated a number of small seedlings from this eight year old tree, which all made big growths the past season. All the other varieties in his orchard bore small inferior fruit.

The wild plums bore heavily everywhere, but on account of the dry weather did not develop to full size except in very rich soil, though they were of good quality. Most of the small fruits bore well and were of good quality. Grapes were a good crop and of excellent quality.

There were more young fruit trees planted out in this vicinity last spring than for many years before. The most of them have made little growth, and many have succumbed on account of the persistent drought. This and almost a total failure of apples has discouraged many to buy and plant fruit trees for next spring; nevertheless, more or less of such varieties which have been proven to be hardy and of good quality and keeping will be wanted. I visited the horticultural exhibit of our state at the World's Fair and found a very creditable exhibition, considering the bad season and scarcity of fruit.

GENERAL FRUITS. FIRST CONGRESSIONAL DISTRICT.

R. C. KEEL, ROCHESTER.

Another year has passed since we had the pleasure of meeting each other and, I think it is safe to say, a year of great discouragement to most of the fruit growers of our state. But this, although it comes hard to many of us, should not mislead us or cause us to lose our faith and courage in the good work, but we should take fresh hold with new energy and hope that 1894 will be one of the greatest fruit years Minnesota has ever known.

There is not much to be reported about our fruit crop, for, in fact, we had no crop in this vicinity. The strawberries came out in good condition in the spring, and how good we felt when on a pleasant Sunday afternoon we went across our ten acre strawberry bed to see the twenty different varieties of plants, each one striving to beat the other in producing flowers. But, alas, blossoms are not fruit, and they turned out to be a total failure. There was not much difference in any of the varieties; the old ones, such as Jessie, Bubach, Crescent, Capt. Jack, Warfield and Sharpless did not produce one perfect berry.

Some of the newer varieties, such as Bederwood, Gillespie, Crawford, Princess and others produced some very fine fruit; but these are yet new and not many of them planted, though I have no doubt but what some of them will be the leading varieties in the future. The older ones, such as Warfield, Crescent, Haverland and others, that have been our standards, should not be cast aside because they were a failure this year. The reason of the failure has been a mystery to me and I think to everybody else. At first I thought it was due to not having fertilizers enough—every third row were fertilizers of the best varieties; but I looked over some fields where every other row was of the staminate varieties, and even these bore no perfect fruit. It seemed as though they were not able to fertilize themselves. This year I put in two rows of staminate to every three rows of pistillates; this I think in an ordinary year will improve the quality of the fruit.

The black raspberries covered the previous winter came out in prime condition; those not covered were hurt. Ohio, Taylor and Gregg are mostly grown here; the latter left uncovered were killed to the ground. Ohio and Taylor would have produced a good crop had it not been for the continuous drought we had all through their maturity, but, after all, they were the best paying crop we had. I like these two varieties. The Taylor is early and ripens evenly and quickly, and the fruit is mostly out of the way when the Ohio comes into market.

The red raspberries were as much a failure as the strawberries, but that was all on account of the drought. A man living west of our town had some Cuthberts planted on low land close to a spring, and he raised the finest berries I ever saw, and they turned out well. The Shaffer's Colossal were the best I had and sold readily for 12½ cents per quart.

Blackberries planted on low, wet land were a good crop, but on sandy land, where we used to raise the best crop of blackberries, they were a total failure, drying up before they ever got ripe, even where they were heavily mulched.

The apple trees were not hurt last winter on my grounds, but the heavy crop of 1892 prevented them from starting many fruit buds; hence, they did not blossom much. Just at the time of blossoming, we had a heavy hail storm which tore off most of the blossoms. The crop of 1893 was as poor as the crop of 1892 was good. I raised a few McMahon White. I like this variety very much; the trees seem hardy and the fruit will keep well and sell well. The Longfield, Duchess and Autumn Streaked are among the best.

The trees, however, made a good growth and are full of fruit buds, and from all indications we shall have an abundant crop in 1894. The farmers are getting interested in the fruit business, and the call for trees and plants is quite good, considering the hard times.

The grape crop was the best we have ever had. The varieties mostly grown are the Janesville, Worden, Moore's Early, Delaware and Concord. The Janesville, although the poorest grape, brought in the most money. We sold them at from 35 to 45 cents per basket, while the better and later grapes we sold at from 27 to 35 cents per basket. At the above prices there is some profit in grapes, but if we should compete with the fruit shipped in, which sold in our town this year at 20 cents per basket, I would plow up my grapes and raise apples and berries on the land.

DISCUSSION.

Col. Stevens: I would like to ask Mr. Keel how many bushels of apples he raised in his orchard.

Mr. Keel: I will never tell. [Laughter.]

Mr. Wilcox: I would like to ask one question at this time. Mr. Keel has brought up the question of weak pollenization of strawberry plants. I would like to ask Prof. Green if he noticed anything. That was one of my troubles.

Prof. Green: Yes, I think there were some varieties with me that were not sufficiently pollenized. That was the reason the ends of the berries did not fill out any better. I had a good crop of strawberries. The land was thoroughly mulched, and it did not suffer much from drought.

Mr. Patten (Iowa): Prof. Green, what would you think of the plan of planting staminate and pistillate alternately in the row?

Prof. Green: I think very favorably of it; I recommended it yesterday. I think you get better results that way than in any other.

Mr. Brackett: About half and half, professor?

Prof. Green: No, it is not necessary; it depends upon the varieties. We use about one-third staminate.

Mr. Wilcox: The main objection to that plan is that you cannot take up perfect plants.

Mr. Toole (Wisconsin): Is it not a better plan, perhaps, to raise plants for plants?

Mr. Brackett: That is the way they do at the Thayer fruit farms.

GENERAL FRUITS.

SECOND CONGRESSIONAL DISTRICT.

J. S. PARKS, PLEASANT MOUNDS.

The past year has been a very poor one for fruits, especially apples, in this district; but in all other things the horticultural outlook is very encouraging. The growth of fruit trees is exceptionally good and healthy, and at this time fruit buds are plenty and sound and promise favorably for a good crop of blossoms, and with favorable spring weather another bountiful crop of fruit. The past season all fruit trees have been very free from blight and all diseases of tree and plant, and no insect pests have appeared. The great crop of fruit of 1892 gave our people to understand the possibilities of fruit raising, and the past season has been a very encouraging one for the nurseryman. More orders and larger ones were taken in our district than for many years previous. One agent for a state nursery sold in my own neighborhood \$97 worth in one day, while a local dealer sold as many more during the season.

The light crop of apples the past season was generally supposed to be because of the very heavy crop of the previous year, but some orchards in our vicinity would seem to disprove that theory. In my own case, what apples I had were on trees out of any shelter from surrounding timber or groves, while those sheltered bore no fruit. A neighbor of mine has fifteen or twenty trees entirely unprotected, that bore a heavy crop of apples both of the last two years. Other cases near me were to the same effect, where trees standing out on the prairie with no protection raised the past season good crops of fruit, while those protected bore very light or none at all. How can this be accounted for? I have great hope for the future fruit prosperity in our state. We shall need wise and judicious planting, as well as careful culture and care of the trees and soil. Plant *liberally* and *continually* and we shall succeed.

I would not advise planting many varieties and only of the most hardy and tried sorts raised in the vicinity, for what might do well in one part of the state, or even in the county, might not do well with others. I speak from experience, having tried over 300 standard and 100 hybrid varieties, besides several thousand seedlings, and found very few to be entirely sound and reliable; although the last few years varieties have flourished that appeared to be entirely worthless in earlier years. Small fruits of all kinds, except cur-

rants, have done well the past season. Blackberries were exceptionally good where covered during the winter. There seems to be an increasing demand for grapes, and there should be more and greater plantings made, until every farm and garden in the land raises a bountiful supply, as grapes can be as surely and easily raised as corn or other farm crops.

Our wild plum has been much neglected; by careful selection and cultivation we could raise unlimited quantities of a very good substitute for the tame plum, which does not seem to do well in our state.

GENERAL FRUITS.

SECOND CONGRESSIONAL DISTRICT.

S. D. RICHARDSON, VICE-PRESIDENT, WINNEBAGO CITY.

Strawberries gave promise early in the spring of being an abundant crop, but on account of the extreme hot weather, or some other cause, scabbed badly and were not more than half a crop. Currants were injured by the borer in many places, and were a light crop; bushes that were well cared for bore well. Gooseberries bore a light crop. Black raspberries bore a good crop; red rather light. Plums bore a fair crop, but the birds, or something else, were very busy picking holes in them while they were ripening. Blackberries, even when covered, seemed to be injured by the winter and were nearly a failure; the weather was very dry when they were ripening.

Apples were a heavy crop in '92, and, of course, were a light crop generally in '93. Some trees bore well; I never saw finer Wealthy and Duchess nor trees more heavily loaded than they were in some places this year.

Mr. Coulter, near Winnebago City, has his orchard seeded to timothy and clover, and pastures with horses until apples begin to ripen. He manures about three inches deep every fall with strawy manure, and raises a good crop of apples every year. Orcharding, as far as the Wealthy and Duchess are concerned, has passed the experimental stage with us, and those who have good orchards find that they give as good, if not better, returns for use of land, labor and money expended, including all the years of waiting before the trees get to bearing, than anything they can raise on the farm.

Grapes, though late, were good and well ripened, but with present prices will only pay for raising for home use and near market. If the average farmer raises his grapes he has them, but if he depends on buying them he usually goes without. The Janesville is a good cooking grape, one of the best, and, if the ground is well mulched and kept rich, will grow and bear without any care. While it is much better to give all kinds of fruit good care, many farmers will not do it and must have something that will thrive without care, or go without fruit. I have lived on a farm many years and know just how a farmer feels when his work is crowding him.

GENERAL FRUITS.**THIRD CONGRESSIONAL DISTRICT.**

L. E. DAY, VICE PRESIDENT, FARMINGTON.

Another year has passed, and we again meet to compare notes for our mutual benefit and for the advancement of the horticultural interest throughout the whole state.

The amount of fruit raised in this district the past year has not been large. Fruit trees passed through the winter of 1892-3 with little injury, but blackberries and the more tender varieties of raspberries, where not protected, were killed, or more or less damaged; apple trees were so severely taxed during the season of '92 that they did not seem to have the vitality to form fruit buds, but where buds were formed trees bore fairly well, though the apples were undersized. I noticed on my own grounds that on some trees badly afflicted with the apple scab in '92 the fruit did not develop so as to average one-half its usual size; yet the past year those trees bore well and the apples were all right.

It was too dry for small fruits to do well, unless they were well mulched; when this was done, good crops were gathered, but not near enough to supply the demand in our district. Perhaps, the past year's experience will teach us something in regard to mulching our berries and vines.

The strawberries that gave the best results in this vicinity were Warfield, Crescent, Capt. Jack and Mount Vernon.

Grapes did better; I never saw the wild vines more heavily loaded with fruit. At the time that grapes had nearly grown, I visited the grounds of Mr. James Pool, who lives six miles southwest of Farmington. He had few apples, but his grapes were looking well. He has fifteen or twenty varieties set out, and tells me he has gathered seventeen hundred pounds of grapes. Others have raised good crops. There were quite a large number of fruit trees set out in this part of the district last spring.

GENERAL FRUITS.**THIRD CONGRESSIONAL DISTRICT.**

E. J. CUTTS, HOWARD LAKE.

While it has been on the whole a very discouraging season, yet failure and disaster have their lessons, and they are equally important and much better remembered than the lessons learned in prosperity.

The season opened very wet, and we had high hopes of a bountiful crop of small fruits. Everything came through the winter in very good condition, and when the strawberry beds were in blossom it was enough to gladden the eye and cheer the heart of every lover of fruit. But, alas, the extreme wet was followed by extreme drought, and the brilliant prospects by bitter disappointment. One piece in particular, which gave promise when in blossom of at least 10,000 quarts, yielded about 2,000. We tried irrigating with a wind mill, but gave it up. One of our neighbors kept team and tank wagon on the

road almost constantly for nearly a week with no particular results, and we concluded that one must have a lake or river to draw from constantly to irrigate with any degree of success.

The crop was so poor that we could not intelligently compare the different varieties. Warfield No. 2 seemed to take the lead among the pistillate varieties and Chas. Downing among the staminate. We were disappointed in Bederwood, but, as before remarked, it was not a good season to make comparisons.

Currants were a fair crop, the Stewart excelling everything else on our grounds. Fay's Prolific is a failure with us; the Cherry only does moderately well; the White Grape is an abundant bearer, large berry and excellent quality. Our North Star bushes are young, and have not fruited with us yet. We were agreeably surprised with some Crandall black currants. We set out a few bushes three years ago, and they bore such a strong resemblance in foliage and blossom to the common flowering currant that we came near grubbing them out the second year; but last season they were a sight to behold, the bushes fairly bending to the ground with the weight of the fruit, varying considerably in size, but a large proportion of them nearly as large as Concord grapes. The quality was excellent, the only serious objection being their unevenness in ripening, making it undesirable as a market fruit but a nice acquisition to any home garden.

Gooseberries were an average crop, the Houghton and Downing being perfectly hardy with us and free from mildew. Raspberries and blackberries, like the strawberry, were almost a total failure. We are pleased to note that Shaffer's Colossal stood the drought better than any other variety. We would emphasize the importance of heavy mulching for all small fruits.

PLUMS—The Forest Garden and Desota are very hardy, bear well, and are of excellent quality. There was an immense crop of native plums, some very good. I think there should be an effort made to select some of the best varieties of native plums for general propagation.

GRAPES—When most all other kinds of fruit have failed, we have always had an abundance of grapes. The most extreme drought has never seriously affected our vineyards, and it was a cheering prospect this summer to turn from the strawberry bed with its shriveled leaves and dried-up fruit, or, later on, from the raspberries and blackberries, from which we received such meagre returns, to the well laden grape vines with their luxuriant foliage. We have never had any mildew to speak of in our vineyards. Nearly all varieties yielded well, Agawam and Brighton were, perhaps, the most heavily loaded; I don't think the fruit was quite as large as some seasons, but the quality was very good. Even the much abused Champion was quite palatable. Moore's Early, as usual with us was a shy bearer; Delawares were very fine, and Concords ripened up well.

To show the effect of clean culture and frequent cultivation, I don't think there was a time the past dry summer that there was not moist

earth within two or three inches of the surface in our vineyard, and the ground was as mellow as ashes.

I am more than ever impressed with the importance of a judicious thinning out of all surplus shoots early in the season, followed up with a reasonable amount of summer pruning.

We think that grape growers should not be discouraged at the low price the past season. The demand for this excellent fruit is constantly increasing, and we believe that those who have vineyards in favorable locations will generally receive a fair remuneration for their labor.

The apple crop in this district was generally a failure, but we noticed very little blight; trees made a fine growth, and the prospect for a crop of apples next season is encouraging.

GENERAL FRUITS.

THIRD CONGRESSIONAL DISTRICT.

D. F. AKIN, FARMINGTON.

Having been appointed one of a committee on general fruits for the third congressional district for the year 1893, and having an associate in the west end of the district, it being a shoestring district, I herewith according to custom submit my report, which will consider more particularly the east half of the district. The early part of the growing season was very wet, making a rank and tender growth in all the small fruits, both wild and tame, such as strawberries, currants, raspberries, and cranberries, till the young fruit was set. Then a drought set in and continued till the earth was dry far below the roots of the plants, causing them to wither in many places, and the heat apparently cooked the young fruit before it was nearly mature. These conditions of the season caused a great diminution of the small fruit crop. Strawberries were nearly a failure; currants a fair crop on heavy, moist land; raspberries gave a two-thirds crop. Considering the weather conditions and the crop of small fruits, we may say that it is a success to such an extent that every person owning an acre of land can have with a little exertion a supply of small fruits in their season and some to sell or give away to their landless friends or neighbors. Grapes did not appear to suffer as much in numbers, but were in size less than usual, though giving a very satisfactory return.

It is not intended in this report to go into any details as to the best varieties for any particular location or to point out the best location for each, nor to tell the novice the particular time to set the plants so they will have a supply of fruit without any further exertion on their part; but it is to assure every person who will try that small fruit culture in this state is a grand success, not only in quantity but in quality, which is superior. With the experience of thirty-seven years we may assure every person who has a chance to raise small fruits in this state, and does not have any, that he is to blame for it himself. It is not the climate nor the soil. Let me say to all, you can raise all the small fruits you have a mind to. Begin at your first opportunity; don't deprive yourselves of such luxuries

any longer. Set out the plants, keep them from being choked by weeds, pick and enjoy the fruit—no secret or hidden road to success.

Pears are not raised to any extent; the few that have been tried have proved a failure. Apples gave the smallest return for several years, in fact we might call them a failure for this year, being affected like the small fruits by the unfavorable weather conditions. Still the planting of apple trees is on the increase, and, with the increase in the number of bearing seedlings, success in apple culture is going to perch on the banner of Minnesota.

GENERAL FRUITS.

FOURTH CONGRESSIONAL DISTRICT.

J. G. BASS, HAMLINE.

I should be glad to make an encouraging report from the fourth congressional district; I am sorry to say I cannot in all respects. The past season was not a favorable one in our vicinity for those engaged in horticultural pursuits. Our apple trees produced very few blossoms, and what few survived were not vigorous enough to carry the fruit to that state of perfection desired by the members of this society. The result was nearly a total failure, as far as my information extended.

In looking over the progress made by this society from its organization to the present time, it animates and gives us new life and encouragement. Our past trials and victories are not complete. Let us press on till we succeed in propagating hardy varieties that can stand the climate of our adopted state.

The different varieties of plums bore a good average crop; those standing at the head of the list are the Desota, Rollingsstone and the Rockford. There are many other good plums growing in our state; let us hunt them up and propagate them, for they are hardy trees, their fruit is not to be despised, beautiful to look at on the trees and when fully matured, delicious to the most of the human family.

Currants were nearly a total failure, as many of the bushes were nearly ruined by the currant worm the year before and dug out as worthless.

Strawberries in the spring looked promising for a good crop, blossomed well and set full. After the first few pickings the dry season was more than they could stand, and the last of the fruit failed to mature and dried up on the vines.

Blackberries shared the same fate. Raspberries, especially my own, were little better than a failure.

Grapes on the Experimental Farm, I think, produced a fair crop, if the large number of paper sacks tied on the bunches are any criterion in arriving at the facts. Education is necessary, it is co-existent with man's life, it goes on in all positions of life one may be called to fill in the shop, on the farm or with the pen. Obstacles must be met and conquered, we are not advancing unless we meet them. So I say to us all who are interested in the welfare of this society and the state of Minnesota, speed on, make haste, let that be our determination!

GENERAL FRUITS.
FOURTH CONGRESSIONAL DISTRICT.

M. C. BUNNELL, NEWPORT.

In order to advance horticulture in Minnesota, I deem it necessary that each member should give his bit of experience, so that one another can profit by it. When one fails in a certain branch of horticulture, he might oftentimes have avoided that failure by learning the experiences of others. I think I can easily account for the poor success that many farmers have in growing fruit, especially apples.

In the first place, they have to learn as to the location, soil, etc., for planting the standard apple, giving the orchard a high location, clay soil and a north slope, if possible; on the contrary, they give the orchard a south slope or, perhaps, plant on low ground and where the soil is not of a clayey nature. Many have seemed to think that it was necessary that their orchards should be in warm locations to avoid the cold north winds, but from past experience they are finding out the errors of their ways. Plant the orchards on high ground and protect them more from the sun than from the north winds. We all have to learn by practical knowledge how to become successful fruit growers in Minnesota.

Every farmer may not have all the requisites for growing an orchard that I have mentioned. If not, they should use other precautions. To keep the sap from starting too soon in the spring, mulch well, keeping away from the body of the tree. When planting incline the tree to the southwest a little, so as to prevent sun scald; head the trees low, and you will not have a long, naked trunk for the rays of the sun to injure. Cultivate the first few years and then, if necessary, seed with clover and keep thoroughly mulched.

The apple crop in Washington and Dakota counties was nearly a total failure—a few scattering Duchess and Wealthy and a sprinkling of crabs. Plums were a much better crop (and, by the way, I would say that good plum trees are becoming more in demand as the farmers find out their hardiness and productiveness.) The Desota, Forest Garden, Weaver, and some Rollingstone are the varieties being planted. Occasionally I find a tree with its foliage infested with little green lice; kerosene emulsions properly diluted and applied will kill the insect.

Grapes mature well. A large portion planted by the farmer are Concord, though some are trying the Moore's Early. I consider the Brighton a good variety for Minnesota. Plant a few Janesvilles for early, some of the Wordens and a few Agawams.

I am inclined to think the currant culture will receive less attention by many on account of the ravages of the worm, still by giving a little time and labor you can get rid of them by applying hellebore at the proper time. The scarcity of the crop made a good demand for them, and the price runs as high as \$4 per bushel. To get the best returns from currants, I would recommend thorough cultivation; manure well and prune out old wood when necessary. I would like to know if there is any one in this society that has cultivated

the Fay's Prolific and found it a profitable variety to plant, also, the Industry gooseberry, and whether it mildews.

Raspberries and strawberries suffered severely from the extremely dry season. New beds of strawberries made runners very slowly. Where they were well cultivated they stood the drought better. In regard to planting raspberries, I would make the distance between the rows seven feet at least and four feet in the rows. Keep them in hills. After picking the fruit cut out the dead canes, leaving from five to six canes in the hill. If you want to be sure of a crop, lay the canes down by removing a spadeful of earth from one side of the root, bend to the ground and cover with earth for winter protection. Uncover about the last of April. Give them thorough cultivation and mulch well with straw, and the grower will be well remunerated for his time and trouble. The principal varieties planted are Cuthbert, Turner, Philadelphia, and some Brandywine for red, and Gregg and Mammoth Cluster for black.

The cultivation of blackberries still continues to receive more attention by small fruit growers in Minnesota, prices in St. Paul market ranging from ten cents to twelve and one-half cents per quart. Stone's Hardy and Ancient Briton are the principal varieties planted. I have seen the Wachussetts Thornless growing in Ramsey county; the Snyder is planted by some. My mode of cultivation would be about the same as for raspberries.

As to the culture of the dewberry, it is very limited in Washington county, and I would like to know whether there is any one among our members that has made them a profitable crop.

In conclusion, I would say that I think the farmers and gardeners still keep up an interest in buying the hardy fruit trees, and it is encouraging to know that they are willing to try our newer varieties, such as Okobena and the Peerless, and some of the Russians. What they want is a winter apple that will stand our Minnesota winters. Let them give the orchard the same care that they do their farm crops, and there is no doubt in my mind they will be well compensated for time and money expended.

GENERAL FRUITS.

FOURTH CONGRESSIONAL DISTRICT.

J. H. STEVENS, VICE-PRESIDENT.

While Hennepin county is generally one of the most successful fruit growing portions of the state, the past season there has been a partial failure in that industry. Apples and most of the small fruits were a light crop. Grapes were a fair yield and of excellent quality. In the more southwesterly part of the county, raspberries were also a pretty good yield. Climatic influences were the causes of the failure, or rather partial failure, of the fruit crop in this congressional district, which comprises Hennepin county.

GENERAL FRUITS.**FIFTH CONGRESSIONAL DISTRICT.**

H. L. CRANE, EXCELSIOR.

My experience in general fruit culture being quite limited it will, naturally, make my report imperfect and I do not know that I can say much of fruit except of the vicinity within two or three miles of my home. The weather being the principal cause of failure or success, generally speaking, affects our district somewhat the same all over, I believe.

The strawberry had a fine prospect till just before ripening, and then came a long season of dry weather, lasting all through the ripening season, and a short crop and small berries was the result.

Raspberries were about a half crop, owing to winter-killing and dry weather. Currants that were well cared for and on high land gave a good crop. Some of the people in this vicinity thought the Snyder and Ancient Briton blackberries did not need winter protection, but they received no blackberries for that conclusion. Those who did protect theirs received a fair crop, but dry weather affected them somewhat.

My plum trees bloomed full, but fell off before they set fruit, the most of them, and I killed what remained with paris green when spraying to kill the caterpillar and curculio; but, otherwise, there was a fair crop in this locality.

The apple crop was very light; I do not think they set full of blossoms in the spring. My own few trees had been worried so for the the last two years with the caterpillars that they did not blossom.

Grapes were a good crop generally and ripened up good and sweet, but owing to the mildew the year before or the snow being off the ground the fore part of the winter some vines were killed or stunted badly. I cannot see that any vineyards were injured that were well sprayed with the Bordeaux mixture the year before. Grapes are my principal crop, having about 4,000 vines, consisting of Concord, Delaware, Moore's Early and Brighton. I find the Delaware the most profitable variety, although the Moore's Early yields well with me, and I get a good price for them. I think the Moore's Early require richer soil than most varieties and are improved by fertilizers.

GENERAL FRUITS.**SIXTH CONGRESSIONAL DISTRICT.**

MRS. JENNIE STAGER, VICE-PRESIDENT, SAUK RAPIDS.

Last spring we had the largest promise of strawberries in this vicinity we have ever had, with an enormous quantity of blossoms. The fruit set beautifully, but when half grown a hot, dry spell came; our hopes were nipped in the bud; our crops were lost. All kinds of currants bore well. Gooseberries were very prolific, with no mildew. Red raspberries bore an exceptionally large crop. Black raspberries were fair, while blackberries did very poorly.

At our place, we had a wonderful crop of grapes and all ripened fully. I sent to the World's Fair, care of our secretary, about ten varieties, including Moore's Early, Concord, Lindley, Janesville, Golden Pocklington, Niagara, Worden, Brighton, Malaga and one I had no name for. As they were cut fresh from the vines, the end of the stem dipped in wax, packed according to orders and sent immediately, I am sure they carried all right.

All through this part of the country grapes did equally well. The plum crop was above the average.

The seedling apple trees sent out several years ago by Peter Gideon have lived and quite a number came into bearing in the last two years, some of the fruit being quite good. Specimens from these were also sent to the Fair. As for old American apple trees, they were a failure, blight in most instances having got the better of them, although the Russians that were planted in previous years are most of them doing well; a few came into bearing last spring. So far the blight has not interfered with them. Quite a number of the people around here sent to Professor Budd of Iowa last spring for Russian trees, and we still live in hopes of finding the ideal apple for the Northwest.

Like many another I wandered through the vast alcoves and avenues of Horticultural Hall at the World's Fair, almost bewildered at the golden profusion of fruit from California and the mammoth fruits from other states; in the midst of which our own Minnesota exhibit shone modest and steadfast. The wonderful varieties and size of cactus, the miniature gardens of Japan, the beautiful silver horticultural hall from Mexico, and over and above all the vast and beautiful building in which all were stored! More wonderful and artistic than the fairy palaces we dreamed of in our childhood's days! Verily, a thing of beauty is a joy forever,

GENERAL FRUITS.

SIXTH CONGRESSIONAL DISTRICT.

JOHN HUNTER, ANOKA.

I should be pleased to send an encouraging report from this part of our state, but by reason of an excessive drought during the entire summer, I cannot make a very favorable one. Strawberries were almost a failure, though some were raised on low ground; the most of these were the Crescent. In many cases the entire plant was killed by the heat, which was a great disappointment to the farmers of Anoka county, as the sandy soil is well adapted to all kinds of small fruit and, especially, strawberries. There is a tendency to grow more fruit in this section.

The principal varieties of raspberries grown are the Turner and the Cuthbert. While the acreage is not as large as for strawberries, there is much interest taken in their culture by farmers and gardeners. But the same cause of the failure of the strawberry crop operated against the raspberry and there was only a fourth of a crop. The crop of currants was very fair. The common red currant was exceptionally fine. Fay's Prolific was a good bearer, but a very poor

currant, being composed principally of seeds. From experience, the White Dutch seems to be the most reliable, as it is a prolific bearer every year. No apples of any account were raised. The crop of native plums was very large. In many cases, the farmers have native seedlings which were exceptionally fine. In fact, the principal crop of fruit was plums and blueberries. The latter were unusually abundant and were quite a source of revenue. Large quantities were shipped to the market.

GENERAL FRUITS.

SEVENTH CONGRESSIONAL DISTRICT.

J. O. BARRETT, VICE PRESIDENT, BROWN'S VALLEY.

The progress made in planting shade trees and shelter belts in the district where I live is slow but sure. A hopeful attention is given to evergreens to protect gardens and orchards. Owing to excessively dry weather during the developing season, the fruit crop was comparatively thin. Farmers yet find it difficult to raise strawberries, blackberries and grapes on the prairie lands to any encouraging degree. Other small fruits, such as currants, gooseberries and raspberries, are, when properly managed, a good success.

In my opinion, it is not the drought conditions alone that imperil us so; the fact is, we can obviate this difficulty to a large extent by deeper plowing in the fall, and more frequent use of the cultivator and hoe to induce capillary action, and by ample mulching to prevent a too rapid evaporation.

Taken as a whole, our farmers pay but little attention to fruit raising. They have wheat branded on the brain, but are hopefully waking up from their dead-lock by engaging in what will better pay in the agricultural line, and this includes apples and small fruits; and they will prove a success here when they read our horticultural reports and follow example.

GENERAL FRUITS.

SEVENTH CONGRESSIONAL DISTRICT.

ERIC ANDERSON, LAKE PARK.

As I am on the fruit committee, you will expect a report from me of some kind, though I do not know what to report, as there is practically no fruit grown in this county. Most everybody says they have tried, but failed. One of my neighbors says he has bought fruit trees and plants to the amount of \$40, but has nothing left now. As to myself, I can say that last winter was the hardest on fruit and ornamental trees since I commenced to plant fifteen years ago. I have Virginia, Transcendent and Martha crabs that have borne four crops of apples; all of them froze down to the snow line last winter. I have five varieties of Gideon's seedlings; all were hurt except Florence, which seems perfectly healthy and bore the third crop this summer. I have another variety that bore apples this summer; it had a small sweet apple; I don't know the name of the tree; and I have Whitney No. 20, which seems hardy but has never fruited.

Plums were the best crop I have ever seen, both cultivated and wild. I have one Desota plum that has not missed a crop for eight years, and last year it was so loaded that some branches broke. I have seedlings from Desota that have borne for two, and some for three years. They have good plums, but none as large fruit as Desota.

Strawberries were a poor crop. I have Warfield No. 2, Crescent and Wilson.

Raspberries were a very good crop.

I have the buffalo berry, Success juneberry and the sand cherry; they are all valuable fruits. The sand cherry I think will grow easily from cuttings. I planted fifteen cuttings last spring to try, and fourteen grew and have developed more roots than willow cuttings planted at the same time.

GENERAL FRUITS.

SEVENTH CONGRESSIONAL DISTRICT.

N. P. ASPINWALL, HARRISON.

I received a notice from your worthy secretary that I had been appointed one of the committee on general fruits for the seventh cong. dist. and was expected to make a report to your honorable society. I am only an a, b, c, scholar in horticulture and am well aware that my report will not be of much interest to you.

The Duchess, Wealthy and Whitney No. 20 apples blossomed very sparingly and had but few apples that matured, and they were not as large and well developed as last year. The Strawberry crab produced a very good crop; they were poor and of an inferior quality.

The Turner and Cuthbert raspberries produced very fine crops in localities not affected by the drouth; they do not winter kill in our county (Kandiyohi). I consider the Turner as a godsend to the farmers of the Northwest; they are hardy, prolific and as easily grown as the currant and gooseberry. I leave the old canes standing through the winter to protect and help support the young canes.

The common red and white currants produced fine crops as usual.

It was an off year with the Houghton gooseberry. It produces immense crops every alternate year.

I am trying the Gandy, Bubach, Jessie and Haverland strawberries. The last two do fairly well. The strawberry is the hardest berry for me to raise; it is uncertain in yield and requires so much hard labor.

There are but few grapes grown; the Concord does well here.

Nearly all kinds of apples that I have tried blight on my ground. I have an unknown variety of a sour crab or hybrid that has never shown any sign of blight.

I have a few trees that were sprouts from dead Wealthy and Duchess trees that are beginning to bear. They are more thrifty trees than the parent stock, and so far have not blighted much. One sprout has proved to be a seedling apple and has shown no sign of blight or disease of any kind.

My orchard is set on a rich, sandy loam, and nearly level. It has good drainage.

There are a few orchards in this county that have stood the winters and produced fairly good crops. They are on high, clay knolls and have timber protection.

Our county is well adapted to the growth of small fruits. It has numerous lakes surrounded with natural groves, in which can be found growing in wild profusion grapes, raspberries, currants, gooseberries, cranberries, plums, wild cherries, etc.

Farmers are paying more attention to small fruits. They should all join your society and get your reports, which are worth much more to me than the small membership fee.

TIMELY HINTS ON SPRAYING.

Culled from Bulletin No. 43, Ohio Experiment Station.

COMBINED MIXTURES.

Combined mixtures have a wider range of usefulness than is commonly supposed; in fact, our leading fruit crops may be best treated in this manner. In most cases where either Paris green or London purple is to be used for insects, it is much better to apply them in connection with Bordeaux mixture than alone, and in some cases where the treatment is specially for a fungous disease, it is well to add an arsenite. The following reasons may be assigned for using arsenites (London purple and Paris green) in combination with Bordeaux mixture:

(1) Where both are required, time is saved by using them in combination.

(2) The Bordeaux mixture prevents the arsenite doing harm to the foliage.

(3) Either is quite as efficient in combination as alone, and in some cases more so.

(4) It is not always known whether one or both are needed, hence, as a precaution, it is better to use both in combination.

MIXTURES USED IN SPRAYING.

Dilute Bordeaux mixture.

Copper sulphate (blue vitrol) 4 pounds.

Quick lime, 4 pounds.

Water, 50 gallons.

Dissolve the copper sulphate in two gallons of hot water and pour into the barrel or tank used in spraying; after which fill the tank nearly half full of cold water. Slake the lime in another vessel and pour into the copper sulphate solution, straining through a brass wire strainer with about thirty meshes to the inch. The lime will not dissolve readily, hence, after pouring off, each time more water is to be added to the lime and poured off as before, until nearly all the lime is dissolved or taken up in suspension, which is really the case. Water to make 40 or 50 gallons in all is then to be added.

A stronger mixture is sometimes made by using three or four times the quantities of copper sulphate and lime above specified.

Cautions: Do not use air-slaked lime, and do not slake the lime in large quantities and allow to stand before using. Do not mix the copper sulphate solution and lime water before cooling by the addition of water, as above directed.

Copper-arsenic solution.

Copper carbonate, 6 ounces.

Paris green, 4 ounces.

Ammonia, 2 quarts.

Lime water, 50 gallons.

The copper carbonate and Paris green may be mixed and dissolved in the ammonia (more or less ammonia will be required according to strength), after which add the lime water. By lime water is here meant clear lime water made by dissolving as much lime in water as it will take up. One-fourth pound of lime to a barrel of water is as much as is required for the purpose of preventing the injury to the foliage which the Paris green might cause. A convenient method is to put several pounds of lime in a barrel and then fill with water; after stirring vigorously allow to settle, when the clear water may be used. The barrel may be filled with water each time before going to the orchard and allowed to stand while gone.

Cautions: Use enough ammonia to dissolve the Paris green and copper carbonate, but no more, and no more lime than above specified:

Ammoniacal solution of copper carbonate.

Copper carbonate, 6 ounces.

Ammonia, 3 pints.

Water, 50 gallons.

Dissolve the copper carbonate in the ammonia and add the water.

Caution: Use no more ammonia than is required to dissolve the copper carbonate. Ammonia is variable in strength, and the amount required must be tested in practice.

WHEN TO SPRAY.

Under each fruit mentioned in the following pages the proper time for spraying will be given, but it is desired to draw attention to and to emphasize one important fact, viz.: *treatment with fungicides is preventive, not remedial.* After a fungus disease has become established, it cannot be cured but it can be prevented, if preventable, if treatment is begun in time; hence, it is important that the first application should be made early, generally before the leaves open or soon after.

It is too late to begin making applications of fungicides after the disease has made its appearance.

It should be remembered also that it is not always possible to wait for pleasant weather when spraying is to be done, but if good results are to be secured the work cannot be delayed for any considerable length of time; hence, it often becomes necessary to spray just before or soon after a rain. In fact, nothing short of an actual rain storm should stop the work when the time comes when it should be

done. Properly prepared mixtures will stick to the foliage, even through hard rain storms, provided they have half an hour in which to dry. Cloudy weather or the appearance of rain should not hinder the work.

Insecticides are not applied until the insects make their appearance, but it is not best to delay much longer than that time.

SPRAYING THE PLUM.

The best mixture to use on plums is a combination, containing a fungicide and an insecticide. The formula for dilute Bordeaux mixture given on page 153 is used, and two ounces of Paris green or London purple added. This mixture is to be applied with a suitable force pump as soon as the blossoms have fallen, and repeated three or four times at intervals of one week. There does not seem to be any necessity for more than four applications, and three have been found to answer very well.

Cautions: Do not spray when the trees are in bloom, but do not delay making the first application more than a day or two after the blossoms have fallen. Do not continue much longer than advised, for the reason that the mixture, if applied too late, will stick to the fruit until after it is ripe. Fruit with a considerable quantity of the mixture adhering may be eaten without danger to the health, but such fruit is unmarketable, and washing is not practicable.

SPRAYING THE APPLE.

In the December bulletin of 1891, one spraying was advised before blooming and three after; but it is now believed that it is better to make two applications before blooming and two after. The first is to be made just before the buds open, using either dilute or strong Bordeaux mixture, but preferably the latter. The second is to be made just before the blossoms open, using the same compound. For the third application, which should be made as soon as the blossoms have fallen, use the dilute Bordeaux mixture, and to this add four ounces, or one-fourth of a pound, of Paris green or London purple to fifty gallons of the mixture. About this time the codlin moth lays its eggs in the blossom end, or calyx, of the apples. These eggs soon hatch, and the young worms are killed by eating the poison, which explains its use. Another application of the same combination mixture should be made within ten days from the time of the third spraying. No further spraying during the season is advised. If desired, the ammonical solution of copper carbonate may be used some weeks later, but it is better to discontinue the use of the Bordeaux mixture at the time specified, as it sometimes causes a russet appearance on the fruit, if applied too late. So far as observed, late applications have not been very beneficial, and four seem to be sufficient. This matter has not been fully settled by experiment, but, no doubt, much depends upon the compound used, the weather, the variety of fruit and the manner in which the work is done.

Cautions: Do not spray when the trees are in bloom, and do not delay the third application more than three or four days after the blossoms have fallen.

SPRAYING RASPBERRIES, GRAPES AND POTATOES.

The raspberry anthracnose was treated quite fully in our bulletin of October, 1891, and, if any change is to be advised, it is to use a weaker solution. Two pounds each of copper sulphate and quicklime would no doubt be sufficient, although this strength has not been fully tested.

For grapes the stronger Bordeaux mixture should be used for the first, second and third applications, which should be made just before the buds open, just before the time of blooming and soon after the grapes are set. Two or three applications should be made thereafter with the ammoniacal copper carbonate solution, but do not use the Bordeaux mixture later than specified.

Potatoes should be treated with Bordeaux mixture and Paris green at least five times during the season, commencing as soon as they are six inches high.

THE BEST EARLY RED GRAPE.—The Moyer is a comparatively new variety and has been in cultivation only half a dozen years, although fully long enough to thoroughly test it and prove it to be a valuable variety in every respect. It resembles the Delaware in size and shape of bunch, quality, habit of growth and hardiness, but is as early as Champion or Moore's Early. It is very sweet, has a thin but tough skin, tender pulp, and is juicy and free from foxiness. It is far superior to the Delaware in its ability to withstand rot and mildew, and has proved quite hardy against these pests. It is of Canadian origin, and a cross between the Delaware and some native variety. The only fault that can be found with it is that it is not readily self-fertile, and so should not be planted in large blocks by itself. This is a fault of other varieties also. When planted with other grapes, it does not fail to set a good quantity of fruit. It seems destined to greater popularity, and may be safely planted for market purposes and in the home garden.—*American Agriculturist*.

FARMER'S CLUB, AMERICAN INSTITUTE, New York—This body is soon to become more aggressive, and, not only to keep up with the times, but to push a little ahead. They propose having frequent exhibitions of flowers, fruits and vegetables, and at each meeting have some essays prepared by the best horticultural talent in the country and issue bulletins for free distribution. In this respect they purpose imitating the Massachusetts Horticultural Society, which is a power for good in this country. They also propose having their exhibitions free, and for a few hours only, which will enable the exhibitors to display their flowers and plants, then dispose of them. At the same time they will be at liberty to sell their exhibits and take orders. These displays, made without outlay to any one, excepting that the Institute pays all the expense incident to getting the exhibits from the growers and in staging them, cannot but create a lively interest, both among the growers and their customers.—*Florist's Exchange*.

Obituary.

IN MEMORIAM.

JOSHUA C. ALLYN,

Died at Montrose, Col., March 31, 1894.

Joshua C. Allyn was born May 13, 1831, in the town of Ledgard, state of Connecticut. His early life was passed near that place. In 1857, he arrived in Red Wing, a stranger and alone. In 1859, he was married to Miss F. Buck in this city, and settled thereafter in Burnside. When the Indian outbreak of 1862 occurred, he enlisted and went to the frontier, where he remained a few weeks. February, 1865, he enlisted for the war of the Rebellion and went south in March, returning in July. In 1866, he sold his property in Burnside and went to his early home to live, but in 1868 he returned to Red Wing and secured the home where he has since lived and led a life honorable to himself and family.

He won the unswerving friendship of all with whom he came in contact by his genial manner, and his frank, upright spirit.

Those who survive him are his wife, two sons and two daughters. The children are Elisha, Arthur E., Miss Lela and Miss Maud Allyn.

Mr. Allyn became a member of this society in 1886, and retained his relation unbroken thereafter till the time of his death. He was a regular attendant at the meetings and contributed his full share towards its work.

An honest, true-hearted man and brother has gone home.

Secretary's Corner.

The present annual paid membership is 440. Hard times keeps us back, but we are growing slowly.

Can't you use some of the Society stationery? Tablet of 100 sheets, 25 cents at this office, 30 cents by mail.

A CORRECTION.—There is a serious mistake in the figures on the cut on page 49, March number, which should be corrected. They should be exactly reversed, No. 1 being 6, &c.

Of the three old members of this society who have lately gone to Colorado to start fruit farms, one, Mr. A. W. Sias, has removed to Florida; a second, Mr. M. Cutler, has returned to Minnesota and is going into fruit raising at Princeton; the third, Mr. J. C. Allyn, whose obituary appears in this number, died there.

Lots of society reports, experiment station bulletins, horticultural periodicals, etc., are coming into this office. We want to give you the cream of these, but our pages are almost too few for the papers and discussions of our own membership even. How can we extend its limits, so that you may get the benefit of the contents of this rapidly growing library?

SUMMER MEETING, 1894. Upon invitation of Mr. and Mrs. D. Morrison, of Minneapolis, accepted by the Society, the coming summer meeting will be held at their residence, it is probable, somewhere near July 1st.

If practicable, the notice of this meeting will be sent out in the June number of this magazine, but to do so it will be necessary to hold it later than the first of the month, as it is not possible to set the date so long beforehand, so much depends upon the forwardness of the season.

So, if the June number does not come on time—it has not miscarried and will show up later.

SPECIAL REQUEST. There are now on hand a quantity of back numbers of this magazine, which might be sent out as sample copies.

Will you (this means you!) please send me at once the addresses of any persons in your neighborhood or elsewhere engaged or interested in any horticultural pursuit, and copies will be sent them. You don't need to take time to write a letter, but just write the addresses on a slip of paper or postal and send it along.

This is a practical way you can assist with little inconvenience to yourself.—Secretary.

Your Corner.

FRUIT PROSPECTS FOR 1894.

The outlook of the fruit crop for this season is so far very promising.
J. C. CRAMER, La Cresent.

Prospect for apples is excellent; grapes, fair; raspberries, excellent; strawberries, much injured by the winter.

CLARENCE WEDGE, Albert Lea.

The prospects for fruit are very good. The ground is full of moisture and nothing is very far advanced yet, as the weather has continued cool.

J. M. UNDERWOOD, Lake City.

I believe everything indicates a bountiful supply of blossoms that seem to be sound, nice buds so far. Talking with fruit growers yesterday from other parts of the county, all seemed to think, that, all things considered, we have the best prospect for a good crop of fruit of all kinds we have ever had at this season of the year.

J. S. PARKS, Pleasant Mounds.

The fruit crop around Lake Minnetonka promises to be an abundant one. Strawberries wintered well and are looking very thrifty. Raspberries are leaving out, and even those which had no winter protection seem to look as well as those which were protected. Grape vines (April 26th) are ready to be taken up. Apple and plum trees are showing abundant fruit buds, but it is too early to predict their fruit prospect.

A. G. LONG, Excelsior.

The prospect of a fruit crop is flattering, was never better. Everything wintered well, and is now in the the best condition. If nothing happens to our apple trees, we will have the largest crop ever grown in Minnesota. I am sure that I will have between 4,000 and 5,000 bushels, if nothing bad happens. Small fruit in excellent condition.

Yours, etc.,

R. C. KEEL.

The prospect at this date is favorable for a more than average crop of nearly all kinds of fruit. Apple trees wintered well and are very full of fruit buds, that, so far, show no injury. Plums will blossom very full. Grapes are all right. Red and black raspberries promise better than usual. Blackberries were injured by starting last fall, but may bring near an average crop. Strawberries: The strawberry outlook is not as good. Two-year old plantations have died out so that they are hardly worth retaining, and the plants in new beds are not as strong as usual; only the most favorable weather conditions will ensure more than half crop.

J. S. HARRIS, La Crescent.

Question Box.

(Please ask and answer questions briefly, and in replying, refer to the number.)

1. Is there any one in this society who has cultivated the Fays Prolific currant and found it profitable; or the Industry gooseberry, and does it mildew?

M. C. BUNNELL, Newport, Minn.

2. Have any fruits ever been brought over from central Norway or the northern part of Norway or Sweden?

O. J. HAGEN, Hendrum, Minn.

3. Dear Sir:—I take the liberty to send you by mail a small package containing what is a curiosity to me, viz., a piece of wood with some kind of eggs enclosed in layers of cartridges of leaves. Please examine them and let me know what they are.

Respectfully, NYE HASKINS, Burtrum, Minn.

ANSWER TO NO. 3.

The specimen is an interesting one, though by no means an uncommon one. You have no doubt seen a gray bee, smaller than a honey bee, in the act of cutting roundish pieces from the leaves of roses and other plants. In some season these bees are so common as to greatly disfigure some of our choicest varieties of roses, as they seem to prefer thick and leathery leaves for their purpose. To build their houses all kinds of holes of a suitable size are utilized. I have found them in the large hollow galls upon oak-leaves, in the burrows of larger borers of solid wood, in hollow stems, in cracks of walls, in the ground, even in the spool of cotton thread. The pieces of leaves are used to carefully line the burrows, and by overlapping and bending they make a number of cells in the least possible space. Each cell is filled with pollen and when finished contains a single egg, which hatches into a worm-like larva that gradually consumes the stored-up food, transforms to a pupa and eventually into an adult bee.

PROF. OTTO LUGGER, St. Anthony Park, Minn.

MINNESOTA SUGAR AND SYRUP:—SETH H. KENNEY, ESQ., Morris-town, Minn., My Dear Sir:—You were awarded a prize on both your sugar and syrup, and will receive a medal worth about \$20.00. Your sugar and syrup were first examined by some foreign judges, and they being called home and not having made any report, I called for a re-hearing by the whole board of awards, and they unanimously concluded that your sugar and syrup was equal to the best, if not the best, on the ground.

In conclusion, I would say that your sugar and syrup was one of the most attractive of our exhibits, and created great surprise especially to those people of the south and foreign countries.

Yours respectfully,

GARDNER STEVENS.



"WYMAN ELLIOT" ROSE.

For description see page 187.

THE MINNESOTA HORTICULTURIST.

VOL. 22

JUNE, 1894.

NO. 5

Experiment Stations, 1893.

CENTRAL EXPERIMENT STATION.

ST. ANTHONY PARK.

PROF. S. B. GREEN, SUPT.

I have the pleasure and honor of presenting you herewith the annual report of the Horticultural Division of the Central Experiment Station. Before referring to the work of the Central Experiment Station, I wish to call your attention to the very interesting and valuable work being done by the experiment stations of this society. I find the work of these stations very valuable to me in experimental work and, I believe, they are so to the whole state. I wish that there was some way to devote more money to the development of this work. It is well worthy of it.

The past season has been a very busy one at the Experiment Station and School of Agriculture. Several changes have been made in the personnel of the faculty and station staff. Prof. Smith resigned his position as director and accepted the professorship of agriculture at the Michigan Agricultural College. Dr. Graham decided to further continue the study of medicine, and his place has been taken by Dr. Reynolds. Prof. Hays has returned to the station, after an absence of about eighteen months, to become agriculturist. Prof. Shaw of Guelph, Ontario, has been added to the staff and takes the position of professor of Animal Husbandry, and Prof. Haecker becomes professor of Dairy Husbandry. Prof. Pendergast, the principal of the school, has left us, and his place is being filled by Prof. Brewster. Mr. J. M. Drew of Rollingstone takes charge of the blacksmithing work, which is a new feature that has been recently added to the manual training department.

The school is prosperous beyond our most sanguine expectations, there now being 136 students registered in it; and in the dairy school, which is a department of the School of Agriculture, there are now about sixty at work, making a total attendance of 196 students.

A new brick building, 76x98 feet on the ground and three stories high, has been put up just west of the dairy school, that furnishes a large drill hall, which is designed also to be equipped and fitted as a gymnasium; besides this, it furnishes commodious and convenient quarters for the manual training and drawing, horticultural, botanical and entomological departments, a museum and dormitory space for eight students. This building cost nearly \$30,000, and is in every respect first class and a credit to the University. The grounds adjacent have been neatly graded and the edges of the drives sodded. In the spring, it will be appropriately planted to trees and shrubs.

Some progress has been made in developing the general landscape features of the grounds about the buildings. The grove has received a much needed thinning by the removal of ninety cords of wood, and drives have been cut through wherever they were needed to the great improvement of the place. Some little ornamental planting has been done, and the plantings made in the spring of 1892 have grown very satisfactorily. One hundred of the more conspicuous shrubs and trees have been marked with iron labels, giving their common and scientific names, and it is designed to continue this work much further the coming year.

The past season has been an exceptionally poor one for horticulturists, generally, on account of the very dry summer. This statement applies not only to this state but to the whole country east of the Rocky Mountains. The only commercial fruit that was generally productive was the grape, which yielded abundantly here, as elsewhere. The small fruit crop was not a failure, but was materially lessened by the dry weather.

The lines of experiment work followed are those which are of special interest to the horticulturists of the state. Experiments have been made as follows:

(1) Variety tests of the different fruits have continued to occupy considerable attention.

(2) In the pollenization of grape blossoms to note its effect on the setting of the fruit.

(3) In the raising of strawberry seedlings from hand-crossed flowers; such varieties as Bederwood and Parker Earle being used for the pollen and Crescent, Warfield and Haverland for the pistillate kinds.

(4) The raising of seedlings of the grape, the raspberry and the blackberry has received some attention. About twelve hundred of these have made a good start.

(5) The block of 300 seedlings of the Schaeffer's Colossal raspberry produced fruit for the second time the past year. I am very much surprised and pleased with the results. Thirty-eight kinds were selected from these that are considered very desirable for further trial. A set of these was sent to the World's Fair. Among them are several varieties of bright red color that are very productive; a few varieties are of a yellow color. Some of the plants are so affected with anthracnose as to be worthless, but it is surprising that there should be so many good kinds. This block of seedlings, good, bad and indifferent, taken together was one of the most valu-

able lots of raspberries at the station the past season. Their fault seems to be that, like their parent, they do not propagate rapidly, though I believe this difficulty will be done away with when we have sufficient plants so that we can afford to make root cuttings.

(6) Fungicides have been used on gooseberries, potatoes and strawberries. Bordeaux mixture had but little apparent effect on the strawberries, while the foliage of the gooseberries seemed to be much increased in vigor by the application of liver of sulphur at the rate of one-half ounce to one gallon of water. The yield of potatoes was increased an amount equivalent to forty bushels per acre. Particulars of this latter case are given in a paper herewith.

(7) Experiments have been made to show the amount of water in mulched soil and that not mulched, and very marked results have been obtained.

(8) Different methods of protecting tree trunks from sunscald, mice and from sudden changes of temperature have received attention, but they will be reported on later in a bulletin. I wish, however, to call your attention to the newly introduced wood veneer, which is very useful for this purpose and is inexpensive.

(9) The subject of evergreen seedlings has received some little attention, and the great advantage of the high screen over the low screen for protection has been again conclusively shown. Special pains is being taken to get a stock of *Pinus ponderosa* for distribution and sale in order to have it thoroughly tried in this state, and about five thousand seedlings of it have made a good start the past year.

(10) The work in planting and care of the forestry plantation has been productive of good results, until now it is an object of much interest to visitors and promises to give much interesting data in the near future.

APPLES.

The apple trees at the station are just commencing to bear fruit, and attract much attention from visitors, and will undoubtedly lead to valuable results. In the Russian orchard, which is a term used to designate the young orchard on the level prairie at the station, has been planted 300 varieties of Russian origin. Some of these have blighted to death, others have winter killed; but many of the remainder are proving to be of wonderful hardiness and of apparent adaptability to this climate. I would especially call attention to the following kinds which have fruited here the past summer. There are other very promising kinds that are not mentioned, as they have not yet fruited.

Lieby. This is, perhaps, the hardiest tree that produces large apples and is free from blight. It is much harder than Duchess of Oldenburg, which it somewhat resembles, and should be tried on every farm in the state. Season, December. An excellent cooking apple and not to be despised for eating out of hand.

Anisim (18 M). An early winter apple of best quality. The tree has not been very extensively tried, but it is apparently as hardy as the Lieby and less liable to blight. Fruit about the size of Wine Sap, which it resembles.

Breskovka. A late summer apple of good quality for table use or for cooking. Tree very hardy, productive and free from blight.

Thaler (Charlotte Thaler). Tree very hardy, very productive and free from blight. Fruit of medium size, excellent quality; season, late summer.

Blushed Calville (22 M). A large apple of extra dessert and cooking qualities. Season, last of August. A good tree and free from blight.

TOP-WORKING.

About seventy Virginia crabs have been top-worked with less hardy kinds the past season. I am very sanguine as to the good results to be derived from this method of growing apples; I believe that by the use of it the range and certainty of the apple crop will be much increased. One hundred Virginia crabs have been set out for top-grafting next spring. The scions of twenty-four varieties of Hungarian apples have been received from the Department of Agriculture at Washington. These were very small and weak and were root-grafted. It is my intention to top-graft them as soon as wood or buds can be found of suitable size.

The work with seedling apples is of much interest and demands considerable time and attention. Out of the lot of seed sown two years ago about two hundred varieties have been saved for fruiting. The superintendent of the Owatonna station has kindly offered to aid in testing these, so a package containing scions of fifty kinds has been sent him for this purpose.

PLUMS.

The crop of plums was very large and beautifully developed. There was very little injury from the curculio.

Cheney. This variety fruited abundantly and is one of the hardiest, thriftiest and best plums ever grown at the Experiment Station. It is of very fine quality, very early and very large. The tree is a fine, strong, healthy grower.

Rockford. This has done very well, and I regard it as a variety of much value, especially for the home garden, where its productiveness and good quality will make it a favorite.

Among the older well tried varieties that have fruited the past season are the following:

Desota. This variety has again demonstrated its great value as a reliable and productive variety. It still leads in these qualities, and is the variety to plant if but one tree is to be set out. Of good quality.

Forest Garden. Very productive. Not as early as the Cheney, but follows closely after that kind. Of fair quality.

Rollingstone. This variety increases in favor. Fruit of large size and excellent quality. Tree healthy and productive. Quite distinct in habit.

Wolf. This variety should be better known. Fruit large and of best quality; pit very small. Tree, thrifty and productive. One of the best kinds.

Weaver. This variety has not fruited as heavily as usual, owing probably to its having been severely pruned back last year. I

regard it as destined to be one of the most popular kinds for marketing on account of its large size and free stone, although it is not of high quality.

LEAF LICE.

The leaf lice were not as numerous as usual on plums the past season and were easily kept in check by the use of the kerosene emulsion, beginning early in the season.

STRAWBERRIES.

The strawberry crop here was fully up to the average, although generally a failure. This was largely due to the retentive soil in which the plants grew and to the fact that they were heavily mulched.

The varieties that have been most productive or are new and, therefore, should be reported on here, are:

Accomack. Perfect. Fruit small and irregular, not productive; of moderate growth.

Atlantic. Fruit large; rather late; roundish and irregular; bright red; not productive. Foliage and growth fair.

Auburn. Pistillate. Fruit roundish-conical; calyx free; rather soft, but of excellent quality and very productive. Foliage and growth fair.

Bederwood. Perfect. Fruit broadly conical, light red, fair quality and early. Firm enough for a near market and very productive. Foliage and growth excellent. It is difficult to say too much in favor of this fine, perfect-flowering variety. Most promising for a pollenizer for the early pistillate varieties.

Belmont. Perfect. Fruit small and irregular; moderately productive. Foliage and growth good.

Beverley. Perfect. Fruit small and inferior. Foliage healthy; growth vigorous.

Boynnton. Pistillate. Fruit of even, medium size, bright red, very firm and very productive. Foliage and growth good. Closely resembles the *Crescent*; is certainly no better here.

Crescent. This variety still holds its own as the most generally profitable market berry. During the past three years the Warfield and Haverland have occasionally produced more and better fruit, but this has always been entitled to a high place, and it is safe to say that there is no immediate prospect of its being entirely supplanted. There is, however, a demand for larger and better fruit than this.

Daisy. Pistillate. Fruit of fair size, rather soft and moderately productive. Foliage and growth good.

Edgar Queen. Pistillate. Fruit irregular, conical, bright red; fair, even size, firm and productive. Foliage and growth good. A fine berry, evidently of great value.

E. P. Roe. Perfect. Fruit very scattering. Foliage fairly healthy, but growth very poor.

Eureka. Pistillate. Fruit large, good color and quality; very productive. Plants vigorous and healthy.

Farnsworth. Fruit small, irregular and scarce. Foliage and growth good.

Gandy. Fruit large and very beautiful. Foliage and growth good. Season very late, and valued on this account. Not very productive.

Gem. Pistillate. Fruit of medium size, bright red and firm. Foliage and growth good.

Gillespie. Perfect. Fruit small in size and quality, and irregular. Growth poor.

Gov. Hoard. Perfect. Fruit small and irregular. Foliage and growth good.

Great Pacific. Pistillate. Fruit of fair size but irregular. It sets a very large amount of fruit, but fails to mature it, except under very favorable circumstances. Foliage and growth good.

Greenville. Fruit large, firm and of good color. Foliage and growth vigorous. Productive.

Great American. Pistillate. Fruit of medium size, rather irregular and late. Foliage and growth good.

Haverland. Not so productive as Warfield but of larger size and much better quality, and well worthy of being ranked among the most desirable kinds. Fruit stems short, and unless heavily mulched most of the fruit will be worthless.

Leader. Perfect. Fruit dark red, rather irregular, large. Not sufficiently productive for the market. Foliage and growth fair.

Lovett's Early. Perfect. Fruit of good size and form and bright red in color. Firm and very productive. Foliage and growth good.

Michel's Early. This variety is not sufficiently productive to warrant holding onto it any longer since the introduction of the Bederwood, which is nearly or quite as good a pollinizer and far more productive.

Middlefield. Pistillate. Fruit of good size, bright red, conical, firm and moderately productive. Foliage and growth fair.

Muskingum. Perfect. Fruit flat with a hard bunch at the end where it is not filled out. Not productive. Foliage and growth fair.

Noble. Perfect. Growth very poor, and little fruit produced.

Oliver. Perfect. This variety is mentioned because it illustrates a fickleness in fruit production that is quite remarkable. We have grown this variety for three years and have scarce got a berry from it, although there has not been a general failure of the strawberry crop during that time.

Parker Earle. Highly reported on by some growers in the state, but at the station it generally sets more fruit than it can mature well. Very productive, when it ripens its fruit.

Putnam. Pistillate. Fruit of good size, light red in color, conical. Foliage and growth good. Moderately productive.

Saunders. Perfect. Fruit medium in size and bright red: Foliage somewhat diseased.

Seedling No. 9. (From John Little, Granton, Ont.) Pistillate. Fruit bright red, medium size, roundish, conical. Foliage and growth good. This seems to be a very valuable variety. Productive.

Seedling No. 7. (From John Little, Granton, Ont.) Perfect. Fruit

very large and dark red. Productive. Foliage and growth good. Very conspicuous on account of its very dark green foliage and long leaf stocks.

Seedling No. 37. (From John Little, Granton, Ont.) Fruit closely resembles the Warfield. Foliage and growth good. Very productive.

Southard. Pistillate. Weak; fruit bright red, conical, of good size and color. Not sufficiently productive to be profitable.

Standard. Pistillate. Fruit small and poor. Growth weak.

Stevens. Perfect. Fruit small and sparingly produced. Growth weak.

Swindle. Pistillate. Sets more fruit than it can mature. Fruit rather irregular, of fair size and good color. Moderately productive. Growth and foliage good.

Tippecanoe. Perfect. Fruit small, irregular and poor. Foliage and growth fairly vigorous and healthy.

Waldron. Perfect. Fruit very imperfect. Not productive enough. Foliage and growth good.

Warfield. With us this still ranks among the few most productive kinds, but in some other sections of the state it is not so highly considered. It is a good shipping berry and is popular for marketing. Fruit only medium in size.

Waupon. Perfect. Fruit medium size, bright red and conical. growth moderate and foliage good. The first picking was large and nice. After the first picking the berries were very small. Moderately productive.

West Lawn. Pistillate. Fruit bright red, medium size, roundish and soft. Foliage and growth good. Not productive.

Williams. Perfect. Fruit conical and of medium size. Growth and foliage good. Fairly productive.

Wilson. Perfect. Fruit well known. Foliage and growth good. Very productive. Has done better the past season than for several years.

Woolverton. Perfect. Fruit irregular, conical, firm and bright red. Moderately productive.

In addition to the varieties mentioned, there have been grown and fruited at the station about four hundred seedlings from Haverland and Warfield crossed with Michel's Early. Sixty of these have been deemed worthy of further trial, and some of them are very promising. All the berries from the varieties reported on were grown on the first crop taken from the bed. Most of the varieties also fruited on beds that were producing their second crop, in fact, the best berries came from the old beds, *i. e.*, those that were producing their second and third crops.

The varieties that have done best with us are arranged in order of value as follows:

Pistillate kinds—

Crescent,
Warfield,
Haverland,
Edgar Queen,
Saunders No. 9.

Perfect flowering kinds—

Bederwood,
Michel's Early,
Wilson.

THE LEAF ROLLER.

Our strawberry plants have been somewhat injured the past season by the leaf roller, which was quite destructive about the time the crop was nearly harvested. By mowing and burning the tops of the plants and syringing the new foliage with Paris green and Bordeaux mixture, the old beds were renewed very successfully and were in excellent condition on the approach of winter.

This insect in its mature state is a small moth. The female lays her eggs for the first brood on the leaves early in the summer. These soon hatch into whitish worms, which roll up the leaves and eat out the green tissue, leaving it brown and dead. They go through their changes on the leaves, and the females emerge during July. The worms from the second brood of eggs, which hatch in July and August, pass through the winter in the ground. Besides the remedies recommended, hand picking, or rather crushing, may be resorted to when the worms are not very abundant. They are very active and often drop quickly to the ground if disturbed, but one soon comes to understand how best to press the leaf to be sure to kill the worker.

GRAPES.

The grape crop was a very large one and generally free from insects or diseases. Of the new varieties fruiting this year, I would call especial attention to the Green Mountain, which I think is destined to be popular as a very early sweet grape for home use. The vine is vigorous, very productive and the branches of fair size, but the berries are rather small.

Colerain. Vine vigorous and healthy. Berry large and white; of good quality. Season, with the Worden.

Mills. Vine very vigorous and healthy. A late variety of a peculiar bronzy-purpleish color. Berry of medium size and adheres well to the stem; flesh firm and meaty with a nice, sprightly flavor. Ripens a little later than Concord or about with the later bunches.

Rommel. Vine very strong and vigorous. Two vines, planted in autumn of '93, bore several bunches of fruit. Judging from these, I cannot recommend it for planting. The fruit was of inferior quality and little better than the Elvira. Bunches compact, medium size and handsome; berry of medium to large size; skin thin, tough; pulp melting. Seems to be prolific. Not sufficiently tried to determine its true value.

Early Ohio. The earliest purple grape I have ever seen. Fruited with us for the first time the past season. Berry and bunch of medium size. Berry purple, sweet and of very good quality. Well colored and quite palatable. Season, Aug. 16. Seems to be prolific. Vine healthy and vigorous.

Ebony. This variety fruited with us for the first time. Of inferior quality for table use but, evidently, valuable for wine. Vine vigorous and healthy.

THE LEAF HOPPER.

The mulched vineyard at the station yielded a very heavy crop of fruit of most varieties. The novel method of cultivation adopted in this vineyard on account of the coarse gravelly nature of the soil

has attracted much attention. A drawback to the use of mulch was this year found in the presence of the leaf hopper in great abundance. These insects pass the winter in leaves and trash, and it has been mentioned that their presence is a sign of slovenly cultivation. However that may be, the mulch on the land is certainly objectionable on account of harboring these pests.

The grape was very free from diseases the past season.

JUNEBERRIES.

This fruit is proving to be well adapted for cultivation and produces abundant crops in the garden. The Osage, Alpina, Chester Center and Success are the varieties that have been fruited. Of these, the earliest and best is the Success. I believe this variety could be profitably grown for market were some practical measure devised for keeping off the robins, who are very fond of it and are not easily kept from eating it. Quite a lot of Juneberry seed has been sown with the hope of getting improved varieties.

CHERRIES.

These have made a very satisfactory growth but have not fruited. I regard the introduction of this fruit with much interest. Besides the work here, there is a full set of promising known kinds in charge of the station at Minnesota City, where they are doing well.

SAND CHERRY.

This fruit was not as productive as usual, but it still produced quite a large quantity. I regard it as of much prospective value and think we shall realize many improved varieties within a few years. As reported elsewhere, we have probably a hybrid between it and the Desota plum.

STATE EXPERIMENT TREE STATION.

OWATONNA.

E. H. S. DARTT, SUPT.

The winter of 1892-3, though not very severe, was somewhat peculiar. The snow line killing was greater than it has been for several years. I think it is caused first by hard freezing, then by the reflected heat of the sun from the snow toward spring, thawing trees suddenly and continuing the drying process. Nearly all one-year-old trees and some two-year-old trees were killed nearly to the ground, whilst the same varieties four to six feet high were unharmed, except a little killing at the tips of the branches. Trees of considerable size are often killed in this way. It is sun-scald. Nurserymen sometimes plow up to their one-year-old trees to prevent it, and boxing and tree protectors will save the larger trees.

The Russian Mulberry, which has been killing back considerably in past winters, having got up a little from the ground, escaped injury and set fruit. English and Scotch Elms, six to eight feet high, had branches killed back a foot or more, indicating that American varieties are best here. The Laurel-leaved and Golden Willows are the best

among the Russian. *Salix Acutifolia* may be admired as an ornamental tree. All the Russian Poplars have done well except that 40 Riga and 23 Riga, which look alike, have developed a kind of blight which attacks the bodies of young trees and gives them a gnarly, bad appearance. *Eleagnus Angustifolia*, or Wild Olive, has proved hardy thus far and is desirable for ornament.

Among evergreens, Scotch Pine, Red Pine and Dwarf Mountain Pine are most hardy. White Pine does not stand drouth so well. White Spruce and Colorado Blue Spruce come next in hardness. Of fifty of the Blue Spruce purchased, not more than six or eight were blue enough to make them much more ornamental than White Spruce. Norway Spruce is a good tree, but frequently fails to grow limbs down to the ground on account of the snow line difficulty. It is a fine street tree. Balsam Fir is a very pretty tree but short lived and should only be planted for ornamental purposes in favorable localities, where a long lived tree is not wanted. American *Arbor Vitae* does not stand drouth very well, and needs a little protection or irrigation in most places. Siberian *Arbor Vitae* is a little more hardy. I have not yet had the genuine Northern Red Cedar, which is hardy. Persons buying should be on the lookout, or they may get Southern Red Cedar, which is of no value. The European Larch is much superior to the American Larch, grows rapidly, makes a fine symmetrically formed top and should be extensively planted for timber and ornament.

In bulletin twenty-four, 1892, from our central station, cottonwood is described as short lived, coming to maturity in twenty years or less. In appended notes, I am reported as calling it a very poor tree. If I said this, I must have been considering it as a street tree in towns or to be planted close about dwellings. I think the cottonwood is worth more to Minnesota farmers than all the Russian poplars that have been, or ever will be, imported. I have just found by measurement that a cottonwood tree, planted in 1869, is nine feet in circumference two feet from the ground, and it looks as if it might have been good for one hundred years to come if it had not been struck by lightning. A few days ago, a farmer told me he had been getting most of his firewood for two winters from a few cottonwood trees he had planted for protection twenty years ago. He saws stove length, then slabs off and splits up without much trouble when the timber is frozen. Of the many trees growing on the station, I have only mentioned a few of those that seemed most important.

THE ORCHARD

now contains 800 fruit trees and 200 evergreen trees, used for protection. The land slopes slightly to the north, air drainage being fair, and land drainage will be supplied where needed. The orchard is planted in square form, rows running north and south, being fifteen feet apart, and trees are placed ten feet apart in the row, giving a chance to test a great many trees without covering much land. A row of evergreen, Scotch pine and spruce, trees stands on the west side, and the tenth row east is Scotch pine. Every eleventh tree in each row is an evergreen, so that evergreen rows extend across the

orchard east and west, at a distance of 110 feet apart. These evergreens will be trimmed up, as they attain size, to secure a rather free circulation of air. When the evergreens have grown to the height of twenty or thirty feet, it is believed that rows of fruit trees standing ten and twenty feet north of them will have GOOD TREE PROTECTION. I have known the Duchess apple tree to do well on what we call a poor location when thus protected, whilst on the same ground, six or eight rods north of the protection, it killed out entirely. An evergreen tree does not much retard the growth of an apple tree standing near it. This orchard has been described before, repetition being for the benefit of persons who have not read former reports. It has been created almost entirely at the expense of the Tree Station, but, I am happy to say, that hereafter it will be enlarged and receive the best of care at the expense of the state public school. This will relieve the station of a large item of expense and make the present appropriation ample, and with the sale of surplus stock and the practice of economy, a portion of it may be left in the treasury. One tree, Seedling A, bore forty specimens of a beautiful small red apple of good quality, growing in clusters. The tree approaches perfection, but blighted slightly for the first time. The orchard, as a whole, is in a prosperous condition, and the worthy object of supplying plenty of fruit for the health and comfort of these dependent children, is likely to be fully realized in the near future.

I append a list of fruit trees growing in the orchard, the condition of each tree being shown. In justice to the trees, I ought to state that some of them, notably rows twelve, thirteen and fourteen, which were set last spring, have not had good cultivation, row fourteen now standing in sod. In these three rows no blight is reported, because it is so difficult to distinguish between the effects of blight and starvation in newly set trees. In marking, vigor is denoted by figures 1, 2, 3 and 0. 1 is good; 2 is fair; 3 is sick; and 0 is dead. R is replaced. Blight is indicated by B with minus and plus signs; also, X following. B—little blight, not enough to do any harm; B considerable blight; B+ badly blighted; BX ruined by blight. Some trees are marked 1 extra, and many not so marked are entitled to that distinction.

FIRST ROW.

CONDITION NOVEMBER, 1893.

1	Kurks Anis	984	3B+	14	Rus Unknown	113-	24	R Hiberna	1Ex
2	"		2B	15	"		25	Whitney	20-1Ex
3	257		2B	16	Duchawoe		26	Unknown	1
4-25	Y o. r Hiberna		1	17	"	3B+	27	Greenwood	1
5	Hiberna		1	18	7M 432		28	Whitney	1
6	"		1Ex	19-20	D Hybrid		29	Duchess	1
7-9	Weaver plum		2	21	Pattons Russet		31-48	Greenwood	1
10-11	"		1	22	Gipsy Girl	oBX	49	"	1B-
11	2d unknown		1B-		R Pattons Russet		50-51	"	1
12	"		3B+	23	Gipsy Girl	oBX	52-54	Whitney	1
13	"		2B		R Hiberna	1Ex	55-60	Greenwood	1

SECOND ROW.

1-5	Tetofsky		1	17-20	Dartt's Hyb.	1B-	29	Hislop c.	BX
6	Duchess		1	21	"	2B+	31-44	D. Hyb.	1
7-8	Speer plum		1	22	"	2B-	45	Seed J.	1
9-10	Wolf plum	O. r. 1	23	Rus.	1.90-2B-		46-7	D. Hyb.	1
11	Garden	O. r. 1	24	D. Hyb.		1	48	"	1B-
11	2d Unk'n Russet	1B-	25	Duchess		1	49-54	"	1
12-13	Russet unknown		1	26	D. Hyb.	0	55-60	Greenwood c	1
14	Dartt's Hyb.		2	27	Wealthy	2B-			
15-16	"		1	28	D. Hyb.	1			

THIRD ROW.

1	Hibernal	1Ex	21-24	Duchess	1	46	Early Strawb.	1
2-4	Duchess	1Ex	25-149M		2B	47	Unknown	1
5-6	"	1	26	Unknown	1	48-52	D. Hyb.	1
7-8	Owatonna plum	1Ex	27	Wealthy	1	53-54	Whitney 20	1
9	Black prune	1	28-39	D. Hyb.	1	55-58	D. Hyb.	1
10-11	Rockford plum	1	40	"	OB	59	Early Strawb.	1
11	2d Rus.	343-1Ex	41-44	"	1	60	D. Hyb.	1
12-20	D. Hyb.	1	45		1B-			

FOURTH ROW.

1	Unknown	1B	22	Evergreen		40-41	Evergreen	
2-6	Duchess	1	23	Milton crab	1	42	D. Hyb.	1
7	White Nicholas	1	24	Evergreen	1	43	Seed L.	1
8	Pattons Native	1	25	D. Hyb. Miller	1	44	D. Hyb.	1
9-11	Miner	1	26	Evergreen		45	Evergreen	
11	2d 18M	1	27	Dart's Hyb.	1	46	Whitney	1
12-13	Unknown	1	28	Evergreen		47	Evergreen	
14	Kimball	O. Eng	29-31	D. Hyb.	1	48	D. Hyb.	1
15	Dart's Porch	O. BX	32	Evergreen		49	Evergreen	
	R. D. Hyb.	1	33	Seed D.	1	50-51	D. Hyb.	1
16	Evergreen	1	34	Evergreen		52	Evergreen	
17	D. Hyb.	1	35	D. Hyb.	1	53	Whitney	1
18	Evergreen	1	36	Evergreen		54	Evergreen	
19	Crab grafted	1	37	D. H.	1	55-60	White Pine	
20	Evergreen	1	38	Evergreen				
21	Milton crab	1	39	Dart's Hyb.	1			

FIFTH ROW.

1	Duchess	1	15-16	Duchess	1	26	Red Anis	1
2	"	0	17	Min	1	27-29	Like Duchess	1
3-6	"	1	18	Unknown	1	31-32	Unknown	1
7-8	Early Red plum	1	19	Min	1	33	Hibernal	1
9	Owatonna plum	1	20	Unknown Rus	2B	34	Rus Unknown	2
10	Garden	1	21	"	3	35-43	Hibernal	1
11	Reponka	1	22	"	3B+	44-51	Whitney	1
12	"	2B+	23	"	1B-	52	Rus Unknown	1
13	Unknown	2B+	24	"	1B+	53	Whitney	1
14	"	1	25	"	1	54-60	Early Strawberry	1

SIXTH ROW.

1	Philips No. 1	1	22	Borsdroff 356-		39	Browery	1
2	" No. 2	1	23	Moscow	3	40	Transparent, Naliv	1
3	" No. 2	1	24	"	OB+	41	Smoky Arcad	1
4	" No. 1	1	25-26	Arabian	1	42	Little Hut 272	2
5	Pattons Russet	2B	27	Vineuse	2	43	Gaines Swedisher	3B+
6	"	1	28	"	1	44	Seed M	3B+
7	Gates plum	O R	29	Pippin 181	1	45	Seed G	1B+
8-10	R " "	O R	31	Duchawoe 264	1B	46	Seed F	2B
11-12	Revel Glass	170	32	Borovinka 245	2B	47	Seed S	1
13-14	Shining Aromatic	1	33	6 Vor	1	48	Seed D	1B-
15	Rosa Aport	2B-	34	217	OBX	49	Seed T	1
16	"	1	35	Good Peasant		50	Seed A-	1
17-18	Stepanoff 213	1	36	Aromatic 354-	1	51-53	Pattons Russet	1
19-20	Heldorn 164-	1	37	Rus 224	1	54	"	1B-
21	Borsdroff 356-	2	38	" 103-	2	55-60	"	1

SEVENTH ROW.

1-3	Longworth pear	1Ex	24	Antonovka	1	41	Saxonia 437	2B
4	Utah Hyb cherry	1	25	Aromatic 977	B+	42	"	B+
5-6	Blk Hawk plum	1	26	"		43	Antonovka 236	3
7-8	Desota plum	1	27-28	Anisette 185	1	44	"	1Ex
9-10	Potawotami	1	29	Rus 222	1	45-46	Aport Orient	1
11-12	Grosca Skalanka	1	31	Reinetta Red	2B	47-48	Moscow	1
13-14	21 Vor	1	32	"	3 borer	49	Red Titka 975	3B
15-16	Rinouski	1	33	Stupka 207	B+	50	"	3B
17-18	Yellow-Sweet	1	34	"	B+	51	Rus 459	0
19	Heron 87 M	1	35	Ribbed 461	2B	52	"	2
20	"	2	36	"	2	53	Rus 87	0
21	Hare Ripka	2	37-38	Lubsk Reinette	2	54	"	2
22	"	2B	39	White Skrute 982	2	55-60	Hibernal	1
23	Antonovka	2B-	40	"				

EIGHTH ROW.

1	Thompson No. 37-	1	17-18	50 Vor	1	40	Orion crab	
2	"	24-	19-20	413 Department	1B-	41-42	D Hyb No. 5-	2
3	"	2-	2B	21-22	Antonovka	2	43-44	Quaker Beauty
4-5	Autograph cherry	1	23-24	Basil the Great	1	45	Phoenix O 26	1
6	Tutoobka cherry	1	25	Royal Table 5 M	1	46	"	1B-
7	Orel cherry 24-	1	26	"	2	47-48	Martha C	1
8	"	23	1	27-28	Hibernal	1	49	Tubbs Ironclad
9-10	White Nicholas	1	29	Painted White 468	1	50	"	1
	plum	1	31	Rus 904	1	51-53	Pattons Greening	1
11	Unknown	1B-	32	"	OB	54	D Hyb No. 26-	1
12	"	1	33-34	Rus 1250-	2	56-57	Gideon No. 6	1
13	Yellow Turnip	1	35	Tiesonhausen	1	58-59	Blushing Maid	1
14	"	3B+	36	Zuzoff	3	60	Seed A M	2
15	Rus	563-	3B+	37-38	Tonka crab	1Ex		
16	"	1B-	39	Orion crab	3			

NINTH ROW.

1-3	Okabena	1	22	Red Streaked	1B	39-40	Duchess seedling	1
4	"	1B	23	Green Glass 187—	1	41-42	D Hyb No. 3	1
5	Thompson No. 38	1B—	24	Rus 149—	2	43	Dartt's Porch	
6	Autograph cherry	1Ex	25	Rus 544—	1Ex		BX—R	1B—
7	Skalanka	1Ex	26	"	1	44	"	1
8	"	1	27	Pear 267—	2B	45	Phoenix Dutch sd'	1
9-10	Black prune	1	28	"	1	46	"	1Ex
11	148 M	1	29	Green Butskora	47		Florence	2
12	Rus 598—	1		382—BX	48-49		"	1
13	Rus Nix	1	31	German Calville	1Ex	50-52	Hart Seedling	1B—
14	Romna 599	1	32	31 T	1	53-54	Va Crab	1Ex
15-16	Shepherd	1	33	Ostronskoe	1	55	Richland Winter	1Ex
17-18	Great Duke	1	34	Rus 228—	1	56-58	"	1
19	Sweet Streaked	1	35	Rus 316	1Ex	59	Seed I	1
20	"	2B—	36	Arabian	1	60	Seed H	2B
21	41 Vor	1	37-38	D Hyb No. 22	1			

TENTH ROW.

1	Russian pear 147	1	21-23	Gideon No. 6	2	43	D H No. 11	1
2	Unknown pear	2	22-23	"	1	44	No name Patton	1
3	Rus Pear 391	1	24-25	Seed 9	1	45	D H No. 27	1
4	Tutovka cherry	1	26-27	Wild crab (Fluke)	1	46	" 25	1
5	Orel No. 23	1	28-29	Leudloff	1	47	" 17	1
6	Orel 24	1	31-32	Wolf River	1	48	Seed F	1
7	Linder cherry	1	33-34	Seed B	1	49	Seed Hislop winter	1
8-9	Ocheeda plum	1	35	McMahon White	1	50	Lowland	1
10	Weaver plum	1	36	"	2	51	"	0 gird
11-12	Winter crab	1Ex	37	"	1	52-53	Prof Goff	1
13-15	Wealthy	1	38-39	Duchawoe 269	1	54	Seed C	1
16	"	3B	40	D H No. 24	1	55	"	0
17-18	"	1	41	" 22	2	56	"	1
19-20	Hart Seedling	1	42	" 22	1	57-59	Martha	1

ELEVENTH ROW.

1	Rus pear 592	0	19	Va Crab	1 Ex	40	Florence crab	2
2	" 392	0	20	"	1	41-42	D H Seed No 10	1
3	Unknown pear	1	21-23	Pattons Greening	1	43-44	Plumbs Russet	1
4-5	" cherry	1	24	"	2	45-46	D H No 7	1
6	Hilman plum. 1 Blk knot	2	25	"	1	47-48	Barrs Y'low Siberan	1
7	"	2	26-27	Seed A.	1 Ex	49	D H No 26	1
8-9	Rollingstone	1	28-29	Peffer No. 11	2	50	"	2
10	Weaver plum	1	31-32	Hislop Seed Wint'r	1 Ex	51	Sarnia crab	0
11	Lowland	1 Ex	33	Gibb crab	2	52	Gid seedling Aug	1
12	"	1	34	D H Seed No. 5	1	53	"	0
13-14	N West'n Greening	1	35	Ackers Duchess	1	54	Phoenix No. 12	1
15	Yearlys Winter	2	36	"	1 Ex	55	Phillips No. 1	3
16	"	2	37	"	1	56-57	Gid seed Peter	1
17	"	1	38	"	0	58-59	Seed G.	1
18	"	2	39	Florence crab	1			

TWELFTH ROW.

1	Rus Pear 392	2	17	Oct.	0	46-47	Phoenix crab fall	
2	"	0	18-19	"	1		Orange seed	1
3	Quackenboss	1	20	"	2	48-49	" 57	2
4	Early Richmond c'y	2	21-33	Gideon	2	50	Magnet from Peffer	2
5	"	2	34	Gibb crab	2	51	"	3
6-7	Hawkeye	1	35	"	0	52-53	Seed R	1
8-9	Cheney	1	36-37	"	2	54-55	Seed P	2
10	Baker	2	38-39	D H seed	1	56-57	Phoenix 62	1
11	Oct.	2½	40-41	Phoenix Duchess	49	58	D H No. 9	1
12-14	"	2	42	Jan.	1	59	"	1
15	"	0	43	"	3			
16	"	2	44-45	"	1			

THIRTEENTH ROW.

1	Arthur from Patton	1	21	Sept.	2	41-44	Duchess	2
2	"	2	22	"	1	45-46	D H No.	2
3	413 True	2	23	"	2	47	Phoenix 32	2
4-5	B-Broune cherry	1	24-25	"	1	48	"	1
6	"	2	26-27	Peter	2	49-50	Unknown	1
7-9	Wyant plum	1	28	"	0	51-52	Red Bark crab	
10	"	2	29-31	"	2		(Phoenix) 1 Ex	
11-13	Excelsior	2	32-33	Sarnia crab	2	53	Phoenix No. 57	3
14	"	0	34-35	Silken	2	54	"	1
15	"	3	36	Unknown	2	55	" No. 50	0
16-17	Isham crab	1	37-38	"	2	56	"	1
18	"	2	39-40	Hotchkiss	1	57-59	" No. 90	1
19-20	Isham crab	1						

FOURTEENTH ROW.

1	Duchess No.8, Patton	2	26	Shields crab	1	47	Baldwin seed	1	
2	"	1	27	"	2	48	F Pet Phoenix	2	
3	Iowa Beauty	"	2	28-29	"	1	49-50	Phoenix crab	2
4	"	1	31-32	Palmer's Sweet	1	51	Phoenix 77	1	
5-6	130 M.	2	33-35	Mitchells Seedling	3	53	Phoenix seed crab	0	
7-8	3 M.	2	36	"	2	54	"	3	
9-10	Wealthy	0	37	"	0	55	Estelline	1	
11-13	Lou	3	38	Borovinka	3	56	"	2	
14-17	"	2	39-40	"	2	57	D H No 19	2	
18	"	3	41-42	Haas	1	58	"	1	
19-20	"	2	43-45	Supposed Wealthy	2				
21-25	Mills Seedling	2	46	Baldwin seed	2				

It should be remembered that we have had a succession of mild winters, enabling us to mark a great many varieties as No. 1 in hardiness. After the next very severe winter, the figures 2, 3, and 0 will come into more general use.

THE NURSERY.

2,000 root grafts were planted, of nearly one hundred varieties, last spring. A good stand was not obtained. Suitable care was not bestowed before planting, and drouth was very severe afterward. 3,000 grafts will be made for next spring's planting of about the same number of varieties, comprising many new seedlings of great promise. Persons having choice seedlings, especially those who received seedlings from Mr. Gideon, are invited to send scions for trial.

DISCUSSION.

Mr. Dartt: I might add a few words to this report. I planted three rows in the orchard last spring, about 180 trees, and I planted about 1500 root grafts; I did not get a good stand of root grafts on account of neglect. I shall plant the coming spring about 3,000, and I intend to improve on my former work, and I expect to obtain a good stand.

Mr. Bunnell: I understand the station was established for the purpose of educating the children in horticulture?

Mr. Dartt: I never thought the children would be educated in horticulture particularly. There was a quarter section of land that belonged to the state, and this orchard was established on that land, and it now contains 800 trees. I never expected to educate the children in horticulture, although we have given them some education. I have educated them in regard to the taste of a big, nice Duchess apple two different years; this last year I did not have any apples, and I bought pears enough to go all round.

FERGUS FALLS EXPERIMENT STATION.

F. H. FIEDLER, SUPT.

The past season was a disastrous one for the horticulturist, as well as for the farmer, starting very late and dry the fore part of the summer. On the eighth of July came a thunder shower, accompanied by a terrible hail storm. Another hail storm came a few days later, and then dry for a month. On the nineteenth of August came another hail storm, followed by excessive rain up to date.

Crops were all poor. The grape vines had all the new growth knocked off by the hail, raspberries and blackberries are damaged to some extent, and apple trees lost many branches. The outlook for 1894 is not the best.

RASPBERRIES.

Gladstone. A worthless variety. Berries very small, dull red, turning brown when over-ripe. Not productive. Hardy.

Golden Queen. Has never borne a berry with me yet. Rather tender. Have had it at the station three years.

Wineberry. Worthless; very unproductive; berries small, sour. Hardy, with protection.

Thomson's Prolific. Quite early; not very productive; berries good size; hardy.

Progress. Bore an immense number of berries, but they are too small. Season early; very stocky; hardy.

Kansas. Not so good as I thought last year. After the first picking, the berries become small and soft, and, therefore, not liked in the market. Good home berry and hardy.

Cromwell. Berries medium to small; good bearer; hardy. Not so good as Kansas.

Philadelphia. Bore a profusion of small, crumbly berries. Will not grow it any longer. Not profitable here on my soil.

Turner. Berries too small; good bearer; hardy.

Caroline. Bore an immense crop of fine berries of good flavor. Not popular in the markets; still it sells better than the natives. Hardy, but pays to cover in winter. The best yielder with me this year.

Cuthbert. The best red; berries late, large, of good flavor. A good market variety and hardy as any with protection.

Gregg. Very good; berries very large and firm. The best seller in our markets of all the raspberries. Yields good.

Ada. A very promising variety. Berries much like the Gregg, but ripen a week earlier and continue in bearing a few days longer. Hardy.

Older. Not productive. Berries large but often imperfect; season same as Gregg; canes of a trailing habit; hardy.

N. B.—*When I say a raspberry is hardy, I mean WITH PROTECTION.*

CURRANTS.

Crandall. Bloomed profusely, but did not bear; same as last year.

Cherry. An old standby. Good sized berries and productive.

White Grape. A good white variety. Not a good market berry on account of its color. Very large and moderately productive.

La Versailles. Very productive; late; very long branches. People do not seem to like its flavor.

Stewart. The best market currant. Very productive; berries of good size.

Fay. Did much better than in '92; berries largest of all currants, but not as many quarts to the acre as of other varieties.

Victoria. Quite productive, but berries very small.

Lee's Prolific. Produced a good crop of large berries. Not salable, except to Englishmen, who seem to like it very well.

GOOSEBERRY.

Houghton. Fruit much knocked off by the hail; still yielded quite a crop. Not much sale for gooseberries here.

BLACKBERRIES.

Erie. Berries did not ripen; all dried up.

Crystal White. Did not bear. Have had it three years without seeing a berry on it.

Ancient Briton. Many berries dried up; a few of them got ripe, but were small. Where grown in the shade, they were very large and productive, which seems to indicate that they want to be grown in partial shade in order to come to perfection.

Lucretia Dewberry. Berries all imperfect, except where shaded. Will try shading next year.

SAND CHERRIES.

I have several hundred seedlings; only about ten of them fruited this year, all of which were inferior to their parents.

PLUMS.

The Desota, Cheney and the Rockford were well set with fruit, but the hail knocked off everything except two Rockfords. They were good plums, about $1\frac{1}{8}$ in. long, but they are not a blue plum, as advertised in nurserymen's catalogues. They are of a deep red color with a bluish bloom.

APPLES.

I did not get an apple on account of the hail. The apple trees planted in 1892 are in very good condition, all of them, but the ones I watered in the fall of 1892 made one to two feet more of new wood than the others.

The apples received this spring (1893) were somewhat backward in growing this summer, and in August, after the heavy rains broke the season of droughts, they started a new growth, and the wood is poorly ripened, and I think I must box them all up for winter, to save them.

VARIETIES.	Date of Vegetating.	Date of Blooming.	Date of First Ripe Fruit.	Date of First Picking.	Average Diameter.	Quality (scale 0 to 10)	Firmness (scale 0 to 10)	Value for Market (scale 0 to 10.)	Value for Home Use (scale 0 to 10.)	Vigor (scale 0 to 10.)	Hardiness (scale 0 to 10.)	Productiveness (scale 0 to 10.)	General Appearance (scale 0 to 10.)
Raspberries—	M. D.	M. D.	M. D.	M. D.	Inch								
Philadelphia.....	Uncovered May 22.	6-16	7-12	7-16	$\frac{5}{8}$	4	9	5	5	6	9	5	8
Turner.....		6-15	7-16	7-20	$\frac{5}{8}$	10	8	8	9	7	9	9	7
Caroline.....		6-12	7-16	7-20	$\frac{5}{8}$	7	6	7	9	9	10	10	7
Cuthbert.....		6-20	7-19	8-2	$\frac{3}{4}$	10	7	10	10	8	7	9	9
Gregg.....		6-17	7-18	8-2	$\frac{3}{4}$	10	10	10	10	10	8	8	10
Gladstone.....		6-14	7-16	7-20	$\frac{3}{4}$	6	6	0	0	9	9	4	9
Golden Queen.....										6	6	0	5
Wineberry.....	Uncovered May 24.	7-15	8-7		$\frac{1}{2}$	4	10	0	0	8	9	1	9
Thompson's Prof.....		6-13	7-4	7-8	$\frac{1}{2}$	10	10	10	10	10	9	7	10
Progress.....		6-14	7-11	7-13	$\frac{5}{8}$	9	9	9	10	10	9	10	10
Kansas.....		6-14	7-18	7-20	$\frac{5}{8}$	9	7	10	10	10	9	8	10
Cromwell.....		6-16	7-12	7-16	$\frac{1}{2}$	10	9	8	9	9	9	8	8
Ada.....		6-15	7-10	7-13	$\frac{5}{8}$	10	8	10	10	10	9	10	10
Older.....		6-17	7-16	8-2	$\frac{5}{8}$	6	9	6	6	8	9	4	8
Blackberries—													
Crystal White.....	5-27	6-19								7	2	0	7
Erie.....	5-28	6-20								5	9	6	6
Ancient Briton.....	5-18	6-17	8-10	8-15	$\frac{3}{4}$	10	8	6	6	8	10	6	9
Dewberry—													
Lucretia.....	5-30	6-14	8-6	8-10	1	10	9	4	4	10	10	10	7
Currants—													
Crandall.....	5-19	6-5								10	10		10
Cherry.....	5-20	5-30	7-9	7-15	$\frac{3}{8}$	9	10	7	9	9	10	9	9
White Grape.....	5-20	5-29	7-11	7-15	$\frac{1}{2}$	10	10	9	8	9	10	9	9
Versailles.....	5-20	5-29	7-13	7-15	$\frac{1}{2}$	7	10	6	10	8	10	7	10
Stewart.....	5-19	5-28	7-12	7-15	$\frac{3}{8}$	10	10	9	9	10	10	9	10
Fay.....	5-20	5-30	7-10	7-15	$\frac{1}{2}$	9	10	10	10	7	10	7	7
Victoria.....	5-22	6-2	7-9	7-15	$\frac{1}{2}$	6	10	5	5	10	10	10	9
Lee's Prolific.....	5-17	6-4		7-30	$\frac{1}{2}$	10	4	4	4	10	8	7	10
Gooseberry—													
Houghton.....	5-11	6-1		8-20	$\frac{5}{8}$	9	8	9	9	9	10	10	10

WINDOM EXPERIMENT STATION.

DEWAIN COOK, SUPT.

This station is situated in southwestern Minnesota, in Cottonwood county, forty miles north of the Iowa state line and sixty miles east of the South Dakota state line, on the open prairie, 1,500 feet above sea level.

The soil is what may be called coal-black prairie, with more or less alkali, and is very retentive of moisture; the subsoil is yellow clay for many feet. There is also considerable limestone in the soil. The station is located on rather low land compared with the surrounding land; there are barely depressions enough in the vicinity to afford good air drainage. Still we are not specially subject to late spring or early fall frosts.

It usually freezes three or four degrees more in the valley of the Des Moines river, which is five or six miles away, than it does here.

We have no difficulty in getting all the stock that we care for to experiment with, but we do have difficulty in getting what we can depend upon as being true to name, and this one fact decreases the value of a report to some extent.

The winter of '92-3, while not a very cold one, was just cold enough to freeze the tip ends of the half-hardy varieties of trees, that had been escaping the previous mild winters.

APPLES.

The crop the past season was about a failure, only a few trees bearing any apples. I am unable to state the cause. The date of bloom, which was scanty, was from the third to the fifth of June.

We have something over 100 varieties of apple and crab trees, yet for this non-fruiting season we can report little in regard to them. The trees mostly made a very good growth, and we had little blight compared with some other seasons. We grubbed out on account of blight this past summer all the Transcendent and Lake Winter, as well as Green Streaked (177) and some of Dean's seedlings. My Red Duck trees blighted badly, and, perhaps, I should have dug them up also. Aside from these varieties we had no blight at this station to speak of; but about all varieties, more especially the American seedlings and the Siberian hybrids, were affected some by a leaf fungus, probably the leaf scab; and it is evident that for best results we must do some spraying.

Out of some 275 Wealthy apple trees, I fail to find any wood that was killed back in the least last winter, but the growth was somewhat discolored. The Wealthy apple has given the best satisfaction of all in this section. The Duchess showed itself hardier than the Wealthy, as I failed to find any discolored wood; but the ends of many of the new growth looked rather pithy.

My notes show that the following varieties of apple trees were free from discoloration, and the ends of the new growth firmer last spring than the Duchess, viz., Florence, Excelsior, Pointed Reipka, Virginia Crab, Romna, 5 Oriel, Yellow Arcadian, Ostrekoff, Kremer Glass, Yellow Fawn, No 272, Breskovka, Hiberna, Rosy Aport and Champain Pippin.

The following varieties show wood equal or about equal to the Duchess, viz., Little Hat, Duchover, Martha, Borovinka, Tetofski, 167, 181, Red Duck, Compton's seedling No. 3, Bagdanoff, Antonovka, Juicy White, Beechers Sweet, Minnesota, Early Strawberry and Russian Calville.

The following varieties show wood as good or nearly as good as the Wealthy, viz., Rollins Pippin, Pattens Greening, Scotts Winter, Sweet Ada crab, Pride of Minneapolis, No. 46, and Grundy of the Thompson's seedlings, Whitney, Grandmother, Thaler, Cross and Compton's seedling No. 1.

I have quite a few Minnesota seedlings besides these enumerated in the above list, but as none of them appear to be as hardy as the Wealthy, and some of them sunscald and blight badly (at my neighbors), I think we should let them drop from public view. .

PLUMS.

This is my favorite fruit. While the crop the past season was not large, it was fair. The average date of bloom was May 29th; the earliest ripening was the Cheney, Sept. 2nd, followed by the Forest Garden, Sept 9th, the Wolf, Sept. 12th, the Desota, Sept. 14th. The

plum crop ripened slowly and at the time we had our first killing frost, Sept. 26th, all of the Speer, a good many Desota, some Wolfs, and even a few specimen of Forest Garden were still unripe on the trees, and froze. I fruited some twenty-five named varieties. It would make this report too long to enumerate the merits and demerits of each variety; but the Forest Garden is a variety I can recommend to everybody that wants plums to plant. It is a rich, sweet plum, of good size; is a heavy and regular bearer, besides its earliness makes it desirable. The Desota is still our leading late plum. The fruit of Desota is rather inclined to get smaller as the trees get older, and the sting of the curculio causes much dwarfed and misshapen fruit, otherwise it, probably, has more good points than any other plum. But it is too late in ripening its fruit for the larger part of the state.

The Wolf plum is not as well known in our state as it ought to be. It does not bear on as young trees as some of the others, but is of fair quality and large size, firm, and a heavy and annual bearer, and the fruit is scarcely affected at all by the curculio, which is a strong point in its favor. I consider it a valuable plum. The Knudson's Peach is promising.

The Wood plum should not be overlooked. It originated from seed planted by Mr. Jos. Wood, of this place. It fruited with me this past season; it has fruited about ten years. This variety is going to crowd the Cheney hard as being the earliest large and the largest early plum. It is fully as large and early and is firmer than the Cheney, and has the advantage of being a heavy and regular bearer. There is no one propagating this plum, except the sprouts which Mr. Wood saves, and no one is interested in booming it. I consider it a valuable plum.

I am growing the Ocheeda, but have not fruited it yet. I had a few of the plums sent me by the originator, which I sampled, and I consider them extra fine. The skin peels off the ripe fruit as readily as from a cooked potato. It originated at Worthington.

I am very much interested in plum culture and am setting out all the new varieties I can get hold of, and think the growing of them will be very popular in the near future. An enemy new to me appeared among our native plums in the shape of fungus spots on the fruit. It affected many varieties. There were a few spots on some varieties last season, and it seems to be spreading. These spots do not show much, except on the green fruit. This may become a source of serious trouble, and we will have to spray for it.

I can't say much in favor of the Russian plums. The trees and fruit buds seem to be about hardy, but they failed to fruit so completely this plum year that I am losing faith in them. As a class, the quality of the fruit is poor, and it is subject to rot and is badly affected by the curculio sting. The crossing of them with our native variety is a promising field to experiment in.

CHERRIES.

Like the Russian plums, the European cherries failed to fruit. The bloom was very slight. The Early Richmond has borne the best of any here.

The choke cherry and the black cherry are productive, and at home here the same may be said of the sand cherry. While these cherries may not be valuable for the market, no farmer or fruit grower will object to having them in his garden.

The dwarf Rocky Mountain cherry sent me last spring from Colorado has made a fine growth, but so far I can see no difference in any respect between it and our Dakota sand cherry.

PEARS.

My Russians have done well in every respect except bearing. None of them show any injury from cold, and only one tree blighted, which was the last tree of my Bessamanka.

STRAWBERRIES.

The crop was the finest we ever had, and it is hard to tell which variety was the best. The Warfield is the firmest one on the list, with a decided tendency to productiveness. The Haverland seems fully as productive, and the fruit is larger and of better form, but it is soft and not as good a grower. The Crescent still holds its own for home use and for near market. My largest specimens were from the Crescent.

The date of full bloom was June 4, there being only one or two days' variation from this date in any of the varieties. The date of first pickings was July 1. Michels Early ripened about two or three days earlier than the above date. On part of our plantation, we left the mulching in the spring until very late and, thereby, kept the bloom back on the plants so treated about ten days; but there was only from four to six days difference in the ripening of them and of those from which the mulch was taken off early.

One of the trials of the strawberry grower is imperfect fertilization. I find that with ordinary management the strawberry is more inclined to imperfect fruit on very rich soil than on soil of only ordinary fertility. I have demonstrated this to my entire satisfaction. The Crescent and some other pistillate varieties will bear a fair crop on rather poor soil without any perfect flowering variety near them, while if so planted on soil that is very rich they will bear nothing but nubs, or imperfect fruit. We had but little rust on any variety.

I shall follow the following plan the coming season with strawberries: Plant largely of the Warfield and Crescent for fruit, and later of Michels Early and Enhance for perfect flowering varieties; set on soil that never has been manured, in rows four and one-half feet apart, with the plants about twelve inches apart in the row; mulch about the time the ground freezes or as soon after as is convenient, and in the spring leave the mulching on as long as possible without smothering the vines. We shall get our early fruit from our old beds, which we let fruit three or four seasons, and our late fruit from our new plantations, that have been retarded by keeping the mulching on late in the spring. I have got the most fruit where I have mixed the male and female varieties in the same row in the proportion of one of the former to two of the latter.

RASPBERRIES.

We are making progress in the wrong direction with the raspberry; varieties do not seem as hardy as they used to. Between insects, fungus and other diseases, we are having a hard time with them. Of insects, the tree cricket is doing great damage. They do the most damage on the suckering varieties, but they are into almost everything, puncturing the canes and limbs, laying their eggs, and the usual remedy of cutting out and burning all infected canes would be impracticable here.

The disease, known as the curl, does us much harm. What it is, I do not know; but the leaves curl up, the plant is dwarfed and the fruit has a bitter taste. It sometimes kills the plants, root and all.

The anthracnose is a serious disease, and is, perhaps, the most destructive to fruit of all, and plants taken (that is, the sucker varieties) from infected plantations are sure to communicate it to the new patch. It is to be hoped that this disease may be controlled by spraying. I have one of Mr. Stahl's spraying outfits, and shall use it another season.

The Brandywine has proved my most profitable red raspberry in the past; my old planting bore me seven good crops, but they are gone now, and the new plantings have done so poorly, I have plowed them up. I got one big crop off my Cuthberts two years ago, but have got nothing since. I even got no fruit from the canes that had been given winter protection. My custom is to give the red raspberry no winter protection.

The Hansel fruited this year for the second time. It is very hardy, and is really a first class, extra early raspberry, blooming June thirteenth and ripening first fruit July fourth, three days earlier than any other variety.

The only red raspberries brought into our market for the past two years were by the writer, and consisted nearly all of a seedling (origin and name unknown) redcap fruit, similar to the Philadelphia. It is a vigorous grower, and resists insects and disease better than any other raspberry I have, and it is my main reliance now for market. The fruit begins to ripen three days later than the Hansel, and continues in bearing a long time. If it has any name, I have not been able to find it.

The Turner is fairly healthy, but it only bears a light crop of small berries.

Black raspberries are healthier and less subject to injury by the tree cricket than the red.

The Gregg produced the best fruit this season, being the third year of bearing. They were injured a good deal by the curl.

The Souhegan is as healthy as any blackcap I have, and, all things considered, my best one. I have several new varieties on trial, most of which are promising. I am in hopes of getting something from them even better than the Souhegan. The secret of growing blackcaps is best varieties, good cultivation, winter protection and the frequent renewal of the plantation. The disease called the curl is not as liable to be communicated to the new patch by the plants set as is the case with the sucker varieties.

I think the raspberry, both red and black, is less subject to disease when grown on soil of only moderate fertility than when grown on soil that has been made rich with stable manure.

The Gladstone is worthless, and I believe the same may be said of the Kenyon.

The Shaffer has done very well, better than most of the reds.

CURRENTS.

The crop was good. Date of bloom: May 28th for the red and June 1st for the black. The black currants produced sparingly. Even the famous Crandall tree currant bore only a few specimens of small to medium-sized fruit, which ripened very irregularly; the bush appears hardy. The old Red Dutch is my stand-by for the reds and bore well this year. Victoria did not bear as much as usual.

Of the newer varieties set the spring of '91-2, the North Star proves to be a good grower and is very prolific. The Long Bunch Holland made a wonderful growth and bore but little fruit, which was of good size and about a week later than the other reds. Stewart's Seedling proves to be a fine currant, and I think no mistake will be made in planting it largely. White Grape is a slow grower and is productive of fine grape-like bunches. A few should be set in every garden.

GRAPES.

The soil at this station is most too dark and cold for the best results with the grape; at least, they can and do grow finer grapes on the bluffs or hills near the Des Moines river. The only disease I have noticed on the grape was the anthracnose, which was confined mostly to a row of Champion, although I noticed one or two vines of the Delaware similarly affected. My best black grape this year was the Worden. We only got a few clusters from our 100 Moore's Early vines, which bore so well the previous year. All of my grape vines were given winter protection and were in good condition for a crop. The Delaware proved to be my best and most productive red grape, and, I think, taken one year with another, it bears more fruit than the Concord.

The Clinton is one of the hardiest and is a pretty good grape, if left on the trellis until after frost or the other grapes are gone, but it will not fruit well on very rich soil. The Janesville, Hartford, Concord and Ives are all productive grapes and will succeed here. The Martha does very poorly.

My most successful and productive white grape is the Missouri Reisling. In quality the fruit is rather poor, but it is so hardy and vigorous and so productive of fine-looking, compact bunches that any one who wants to be sure to grow some white grapes should plant it. It seems to be about in every respect a white Janesville only it is some fifteen days later.

The Worden was no earlier to ripen this year than the Concord. The Perkins is a very successful bronze grape, though the quality is poor. Dracut Amber is quite early, large, and promises to be valuable.

JUNEBERRY (DWARF).

This is one of the fruits that is destined to be popular. It ripens between the strawberries and the raspberries, and is the size of a large, black currant. It is black with bloom. It is healthy, hardy and productive, and, as yet, shows no weakness. I can recommend it for general planting.

GOOSEBERRIES.

Thus far, I have made a failure of all gooseberries I have tried. I have about concluded that I am not adapted to gooseberry culture. The trouble seems to be mildew and winterkilling. If we can prevent the mildew by spraying, perhaps I may yet succeed in successfully growing them.

FRUIT TREES AND WINDBREAKS.

I have found nothing that gets there like the cottonwood, still, six miles north of here on Red Rock ridge, and all through that country where the soil is underlaid with rock, they are worthless. They will not stand much shade; they are a light-loving tree and want plenty of room. I place the soft maple next in value. The soft maple is a shade-enduring tree and will stand close planting. I shall set considerable of both varieties in the spring. My rows will be sixteen feet apart, with trees four feet apart in the row. I shall alternate the rows with soft maple and cottonwood.

The Russian poplars, Petrovsky, Bercolensis and Certinensis, I consider worthless. The Petrovsky was so badly infested with the borers that I cut them down a year ago, and I shall have to cut the Wobskys down for the same reason. Pop. pyramidalis looks fine and is promising, but it looks so much like the Lombardy that I am afraid of it. Pop. Siberica, while not as rapid a grower as the cottonwood, is promising. It has many side branches and has buds resembling the balm of gilead. Of two green ash trees set the spring of '88, and well cultivated since, one is doing very well, the other was destroyed by the borers.

WILLOWS.

The willow worm destroys the foliage of nearly everything in the willow line, but I have grown at this station two varieties of Russian willows that are rapid growers, ornamental and entirely exempt from the ravages of the willow worm. They are *Salix acutifolia* and the laurel-leaved willow (*Salix laurifolia*). Of the latter, I have shoots of this season's growth eight and ten feet high.

ORNAMENTALS AND CONIFERS.

In these, I am behind the times. The Russian olive (*Oleagnus angustifolia*) is a peculiar looking tree with spurs of foliage resembling the buffalo berry. With good culture, it grows as rapidly as the cottonwood. It has silver-colored fruit about one-half an inch long, that stays on the tree all winter and into the middle of the next summer. Each fruit has one large seed with a thin covering of a sweet mealy pulp, that is usually relished by children after frost comes. The branches are thorny and, I should judge, would be valuable for a hedge plant.

The berberry (red-fruited) is a fine shrub, that is hardy; it looks fine in the fall and early winter with its load of red fruit. The high bush cranberry is a shrub that should not be overlooked; it is ornamental, and the fruit is good for jelly.

CONIFERS.

I have but few varieties of these. The arbor vitae I find hard to get started; I think they root too near the surface and dry out. I have two trees, set the spring 1886, that are doing very well; they have been kept well mulched with stable manure most of the time since; but the ten thousand seedlings put out two years ago are dying off fast; I don't think they are adapted to our soil and climate. The Scotch pine does well here and grows rapidly with good culture. I consider it our most successful evergreen for windbreaks; this could be properly called the pioneer evergreen. The white pine, while not so well tested, is doing well so far. The Austrian pine holds its green color well and may be one of our successful conifers. The dwarf mountain and juniper are hardy, and hold their green color well. The Norway spruce is doing finely. It does not grow as rapidly as the Scotch pine, but for ornamental purposes as well as for windbreak it is excellent.

The white spruce should take front rank for ornamental purposes. I consider it superior to the Norway spruce and, like that variety, it is easily transplanted and holds its green color remarkably well.

In conclusion, I will say my thanks are due to Prof. S. B. Green, for his painstaking care in keeping this station supplied with stock to carry on this experimental work with.

ALBERT LEA EXPERIMENT STATION.

CLARENCE WEDGE, SUPT.

At our station, the past winter showed its effects upon the points of growth of nearly all varieties of the apple, particularly on yearling nursery trees. Among the latter, about the only variety that generally started from the terminal bud last spring was the Virginia crab.

Of the orchard trees planted two years or over, the varieties of Russian origin in general appeared to have the hardest wood and showed the least discoloration. Trees of the Sweet Pippin (321), Blue Anis (382), the Antonovka and Arthur were clear and bright to the very tips. The first mentioned is a sweet apple of good size and choice quality, that ripens two weeks before the Duchess; it has never shown blight, and, if it proves a good bearer, will be a valuable variety. The last mentioned is an American seedling that gives promise of as great, if not greater, hardiness than any other seedling on trial. The Haas and Roman Stem were killed back, as were also trees of the Peerless. The latter did not seem to lose any vitality, however, making a good growth the current season.

Very few of the trees in orchard bore even specimen apples the past season, and, as there was little or no blight or other disease

among the trees, there is very little progress to report in the direction of finding out the more valuable varieties of the long list on trial.

With the view of testing the value of *Pyrus arbutifolia* as a stock to dwarf the apple, several buds of *Anisim* were inserted in them the past season. They have taken perfectly.

THE PEAR.

Two trees of Kurskaya (392), which blighted nearly to death the season of 1892, finished by bark-blighting in a girdle about the trunk. The live branches were full of blossoms, and it was with considerable regret that we threw the fine large trees on the brush pile. We have this variety top-worked on Hibernial, two years, which has so far made a smooth, even growth and union.

THE PLUM.

The Desota and Forest Garden fruited well, but were affected in both leaf and fruit by a fungus similar to the scab which injured the apple in the season of '92. The variety called *Communia*, received from Ames, Ia., winterkilled to the ground, but has sprouted true from below the surface, and is a very vigorous sort.

We tried cellar-grafting several varieties of plum upon about 1000 stalks of one-year sand cherry. Although grafted at the same time, they showed much difference in their adaptibility to the stalk. No variety made a really good stand, but the Desota and Cheney did fairly well, while the Rockford and Rollingstone were nearly a failure. However, buds of Rockford, put in last August on sand cherry, took on almost every stalk.

Several plants were set of the so-called improved dwarf Rocky Mountain cherry. They appear to be rather more slender in habit of growth than our sand cherry. They bud freely upon the native plum.

THE CHERRY.

We have little to report upon our cherry orchard, except that the rabbits seem especially fond of the little trees, biting the twigs and girdling the trees as early as the month of August, even when surrounded by nursery apple trees, that were untouched.

THE GRAPE.

We have had a steady increase of the black rot among us up to the present season, and find that we shall have to spray or give up our vineyard. Moore's Early gave us the best crop yet received from that variety, the result, no doubt, of the longer pruning we have adopted for that variety.

ORNAMENTAL TREES AND SHRUBS.

Acer Ginnala, dwarf maple, appears to be sufficiently hardy, but its foliage has been unhealthy the past two seasons, inclined to be wrinkled and drawn at the edges of the leaves.

Spiraea Douglassi winterkilled to the ground, but sprouted again very strongly.

Spiraea Van Houttei has passed beyond the experimental stage in Minnesota, but, as it is yet rarely found in ornamental plantations, it may be of interest to state that, in addition to being proof against the cold, it appears to endure drouth and abuse as well or better than the lilac. It blooms freely the second year after planting, and when in bloom is the peer of any flower. The grace of its habit and the perfect health of its foliage also render it a thing of beauty the whole season. It is a shrub for the million, and ought soon to be found about every country home.

Lonicera Media. A climbing honeysuckle that grows very rank, with beautiful, clean, healthy foliage. It grew from the terminal buds after the past trying winter. Its blossom is not very conspicuous, resembling the native honeysuckle.

Caragana Redowsky. Perfectly hardy; blossomed quite freely the past season. Flowers are yellow and about the size and shape of the common pea; foliage healthy.

Rosa Rugosa seems to be a favorite with all who visit our grounds. Its foliage is always beautiful and healthy, and some of the leaves when touched by severe frosts are exquisitely beautiful, and hold their style and color remarkably when pressed.

Alnus Incana. An interesting tree which seems to be perfectly hardy, enduring drouth well; foliage healthy.

Prunus Maackii or May-day tree. Two years planted; has not bloomed, but has been hardy; made strong growth, and gives promise of a robust habit that will stand neglect and abuse.

EXCELSIOR EXPERIMENT STATION.

C. W. SAMPSON, SUPT.

The vines all did fairly well the past season. Some four or five died last winter from some cause. Only one vine bore fruit this season, and that was Dracut Amber; white; bunch medium size; berry nearly as large as Concord; early; vine hardy and productive, and a most excellent table grape; ripens with the Delaware. I have my vines well protected this winter, and I hope they will get through in good shape.

MINNESOTA CITY EXPERIMENT STATION.

O. M. LORD, SUPT.

Strawberries. Varieties: Jessie, Warfield, Bubach, Princess, Downers Prolific, Crescent, Captain Jack, Manchester, Lovett's Early, Van Deman, Michel's Early, Pearl, Sandoval, Parker Earle and Bederwood.

The largest crop, and finest fruit was of Bubach, Princess and Jessie, in the order named. Downers and Warfield promised well, but were small and inferior on account of severe drouth. Bubach suffered less than any other variety.

Raspberries. Varieties: Red; Turner and Cuthbert. After experimenting for several years with numerous varieties, these are found to be the most reliable at this station. The crop for the last year was abundant and of fine quality.

Purple. The Shaffer again produced heavily, and is a very desirable kind.

Black varieties. Gregg, Tyler, Nemaha, Kansas and Palmer. All bore well. The Gregg appears to be standard everywhere. There is practically very little difference between Gregg and Nemaha. The fruit of Tyler here is small and soft. The Kansas ripens all at once and, therefore, furnishes but one picking. The Palmer ripens before Gregg and Nemaha and at the same time as Tyler, yields a large crop, and is a very desirable variety. It appears more thrifty and hardy than any other.

Currants have been nearly destroyed for the last few years by the currant worm. This year they were sprayed once, when the worm first appeared, with one teaspoonful of paris green to four gallons of water. The worms did not appear again, and a fine crop of currants was grown.

Blackberries. Varieties: Briton, Snyder, Stones Hardy and Taylor. Early Harvest has been thrown away. Where the bushes were heavily mulched, blackberries did fairly well, but, generally, the drouth was too severe, and only a light crop was realized. In setting for market, I would set largely of Briton.

For a near market, the Snyder is valuable. Stones Hardy is of very nearly the same character in habits of growth and quality of fruit. The Taylor is not nearly as productive as either of the others.

Grapes. Varieties: Concord, Delaware, Iona, Worden, Moores Early, Agawam and Lindley. All the vines were productive, and the fruit of large and unusually fine quality. Last year they were somewhat affected with mildew and also with black rot, and preparation was made this year for spraying with Bordeaux mixture; but, as no disease or insects appeared, no spraying was done, from which I infer that dry ground and a dry season is most favorable for grapes.

To this station was assigned as specialties native plums and cherries. Of the cherries I can only report that they have made a fine growth, but, as yet, are too young to bear fruit.

(For plums see article on "Native Plums," page 62, March No.)

NEW ULM EXPERIMENT STATION.

C. W. H. HEIDEMAN, SUPT.

SEEDLING ROSE "WYMAN ELLIOT."

Nature has been very kind and has evolved for me from the seed of an unknown Bourbon rose a seedling rose, which gives promise of soon occupying a position of honor as the first rose of merit to hail from the north star state, and the first and only climbing Bourbon rose in the world.

Having wintered outdoors at this station during the winter of 1892-3 without a particle of protection, it may be considered reasonably hardy. Color, a fresh creamy blush, splashed and dotted with rosy lilac, deepening with age, a perfect water lily in form, with delightful Bourbon fragrance; petals shell-shaped and of great substance; very vigorous and free-blooming. I feel safe in claiming more

good qualities for it than is possessed by any other rose in the world. I take pleasure in bestowing on it a name dear to the members of the Minnesota State Horticultural Society, "Wyman Elliot," not only as a compliment to this society, but to a gentleman who has kindly encouraged the writer in his attempts to discover some of nature's laws.

SECONDARY EFFECT OF FOREIGN POLLEN.

My experiments in crossing and hybridizing native plums and sand cherries the past two seasons clearly show a general secondary effect of foreign pollen on the fruit the current season in all or nearly all varieties of our native plums and cherries. The beneficial effect of cross-fertilization as a means of increasing productiveness has been observed by many writers on the subject of plum culture. My experiments clearly show that the effect not only extends to increased or decreased productiveness, but is also as clearly shown, within certain limits, in the size and quality of the fruit, and the question of obtaining such increased beneficial results is certainly within our control. I am not certain whether the adaptiveness or non-adaptiveness of pollen will prove the rule in all localities and under different conditions, or whether the question of which particular pollen is best adapted to produce given beneficial results must not be worked out for each different locality.

My data is as yet insufficient to be given out for the practical value which it promises; however, my experiments have been carried far enough to prove an universal rule. There is no doubt that with the right kind of pollen the productiveness, size and quality of all our native plums can be increased. I will cite but one of many experiments recorded the past two seasons, which can be verified by any one having the varieties at hand.

The Wolf plum possesses many qualities to make it desirable for use as one of the parents of a future improved race of plums. The past season, I pollinated about one hundred blossoms on the Wolf with pollen of six other varieties. Those pollinated with pollen of Hiawatha soon showed the beneficial effects of the cross and were far superior in size and quality to all the rest. Hiawatha is one of my seedlings, a pure *P. Americana*, and, probably, the finest native plum in the world; but it comes so near being a male that, although it blossoms abundantly, over ninety-nine per cent. of the blossoms are without pistils and are so unproductive on that account as to be of no value except for experimental purposes. The same pollen on other varieties gave good and indifferent results.

In the case of ten blossoms pollinated with pollen of Hammer, a probable hybrid between *P. Americana* and *P. hortulana*, originated by H. A. Terry of Crescent City, Ia., the fruits differed only slightly in shape, but were otherwise very fine and equal to the first cross. Ten blossoms pollinated with pollen of New Ulm, one of my seedlings, that is productive with its own pollen, developed only normal fruits, and were rather inferior to the self-fertilized Wolf. Ten blossoms pollinated with pollen of a supposed (unpublished) new species, indigenous to Minnesota, developed very small fruits and changed the fruit from nearly freestone to a perfect cling. Ten blossoms pollinated

with pollen of Early Red (Russian) set no fruits. Ten blossoms pollinated with pollen of Caroline, one of my seedlings, developed fruits inferior to those of the self-fertilized Wolf. As a check on fertilization, ten blossoms were self-pollinated, and they developed fair fruits but inferior to those fertilized by Hiawatha and Hammer, though superior to the other crosses. These crosses were all made on one tree, on different days. The blossoms operated on were all at about the same stage of maturity and were carefully protected until the fruits set. The individual differences within the same group were scarcely noticeable, but were quite marked when the different groups were compared. Other crosses were made which as clearly showed the adaptiveness of the pollen of certain varieties over other varieties.

The idea of mixed and close planting of varieties may be carried too far and in the wrong direction, unless a study is made of the secondary effects. My attention was first attracted to the possibility of influencing the size and quality of plums by the use of the right pollen by the following fact, which alone is accountable for in no other way than except by the direct influence of foreign pollen: A chance seedling was planted on my grounds almost under the leaning top of a tall Weaver plum tree; for several years the fruit was a large, flattish, oblong freestone of good quality and very productive. The plum being so much better in quality than the Weaver, the Weaver tree was cut down the next season and ever since the fruit has been smaller, nearly round and a perfect clingstone. Last spring, I applied pollen from the Weaver to a few blossoms, and the fruits clearly showed the effect of the Weaver pollen.

The effect may sometimes be observed only in the seeds. Last year, while opening some hews of the native wild rose (*Rosa Virginiana*), which had been hybridized with various hybrid remount roses, I noticed several seeds which were larger than, and different in color and shape from, the rest of the seeds in the same hew. They were so near like the pure seeds of remount roses that I concluded the seeds had got into the pan in which I was washing them by accident, and I threw them away. The very next hew that I opened contained several seeds of the same character. These seeds were planted separately and produced seedlings which can scarcely be distinguished from remounts and show no hybrid character as yet. The balance of the seeds produced seedlings like *R. Virginiana*, and among them some which showed the hybrid characters.

I am aware that scientific men at several experiment stations have experimented in this direction and have come to the conclusion "That as far as immediate secondary effect of pollen is concerned upon rosaceous plants, which comprise our apples, plums and cherries, there is a dispute, and that the weight of authority indicates an absence of immediate effect."

With due deference for the opinions of these gentlemen, can they explain the above, or the case of the plum changing in size and quality and from a clingstone to a freestone, by any other theory than *that between slightly differentiated individuals of the same species there is an immediate secondary effect of foreign pollen?*

I have not looked for sensational results, as seems to be too often the object of experimenters, and, failing in which, they condemn the evidence of careful observers; but have looked for general results, and have found sufficient to prove that the secondary effect of pollen is an universal rule.

The only apology I have to offer for entering the field of "Secondary effect of pollen" is because my work of classifying the sexual affinities of our native plums has brought out the above facts which directly bear on the subject.

OTHER EXPERIMENTS.

I hope next year to report the result of my observations on autumn color, oxidation of chlorophyl in the leaves of sand cherries as an index to the color of the fruit; also, to submit a classification of the sexual affinities of our native plum, *Prunus Americana*.

DISCUSSION.

Mr. Harris: The committee on nomenclature moves that the name given to the new rose be the "Wyman Elliot."

(The motion was seconded, and on vote was carried).

Mr. Elliot: This is an unlooked-for honor, and I hardly think it is wisely bestowed; I think the name would kill it. (Laughter.) I think in naming our plants and trees and fruits, we should give them one name only. That is what the American Pomological Society recommends, and while I thank Mr. Heideman for the honor conferred, I would suggest that only one name be given to the rose.

Pres. Underwood: I suggest calling it only "Elliot."

Mr. Harris: I am willing to accept the suggestion to leave "Wyman" off, and name it "Elliot."

Prof. Green: I think we might as well follow the custom; there are dozens of roses named for two names, and I think "Wyman Elliot" is just as good as any.

Prof. Underwood: I think it ought to have been provided that Mr. Heideman should send Mr. Elliot a rose.

Prof. Green: It may be interesting to know that Mr. Heideman sold this stock for \$1,000, and has sold out his interest entirely.

ST. CLOUD EXPERIMENT STATION.

D. E. MYERS, SUPERINTENDENT.

On account of the extreme drought this last spring and summer, I am unable to make a very favorable report. We have to depend on wells for our water supply, and the season was so very dry we were

forced to cut off using water for anything except that which was necessary, consequently, our lawn and shade trees had to suffer. Nearly all of the evergreen trees have died.

The strawberry crop was a complete failure; the vines blossomed full, but few developed into berries, and what there was were very small.

The raspberries did better, in fact, we had an immense crop, and the berries were large and well filled; the varieties were the Cuthbert and Crimson Beauty. The bushes were well mulched, consequently, did not suffer so much from drouth.

The apple trees shipped us did well considering the season, but did not make much of a growth.

EXCELSIOR EXPERIMENT STATION.

H. M. LYMAN, SUPT.

Apple trees in this vicinity yielded a lighter crop of fruit this year than usual, though the size and quality of the fruit was fair. There was not as much injury from blight as in some former years.

Of the trees received from the central station in the spring of '91, the Hibernal has blighted some but bore a few apples. No. 340, Lowland Raspberry, looks hardy and bore a few small, but quite good, early apples. Nos. 286, 599 and 444 look very well, but have borne no fruit. Several other varieties, received at the same time, blighted, which I mentioned in my last report.

The trees received in the spring of 1892, are looking well. Pattons Greening looks like a promising variety. The other were Charlamoff, Good Peasant, 74m, 4m, Martha, Pride of Minneapolis, and Repta Kishoe.

The apple trees received in the spring of 1893, were the following varieties: two Anisim, two Borovinka, two 4m and one 200. I also received four varieties of plums. The apples and plums set this spring made a good growth. I cannot report further concerning them until they have passed through more seasons. I planted out about fifteen varieties of apple rootgrafts last spring, many of them from hardy seedlings.

Time only will tell whether it will be a good investment.

LA CRESCENT EXPERIMENT STATION.

J. S. HARRIS, SUPT.

Strawberries. Our success with this valuable fruit has been very far from encouraging. Our system of growing them is in matted rows. As far as possible, we make our plantations in the spring, using no fertilizers at the time of planting, but choosing ground that has been liberally manured the previous year for some garden crop, or heavily manured and plowed in the fall previous to planting. We set the plants with rows four feet apart, and in the row sixteen to twenty-four inches apart, according to the habit of the variety. In the case of pistillate varieties, we alternate every third row with some staminate variety for the purpose of effecting pollenization.

A cultivator is run between the rows soon after the setting and about once every week or ten days until towards fall. In the earlier part of the season, the cultivator is run as close to the rows as can be done without damaging the plants. We do not clip off the runners that start in the early part of the season, but turn them into the row where plants are wanted and encourage them to take root as early as possible. After runners are starting freely, the cultivator is gradually narrowed up until it only cleans a space between the rows from sixteen to eighteen inches wide, and the plants in the rows are kept clean by hoeing and hand weeding. Some attention is given to directing the runners to points where plants are wanted, and clipping late runners or thinning plants of varieties that multiply too freely is sometimes done. The beds are generally fruited two seasons and then plowed under.

Our plants set in 1892 very generally made a good stand and filled the matted rows finely. They also, apparently, came through the winter of 1892 and '93 in good condition, and up to the morning of May twenty-second looked unusually promising for a large crop of fruit. Upon that morning, they were considerably damaged by hail, that knocked off what blossoms had opened and cut and bruised the buds and foliage. Later the plants blossomed freely, and we anticipated an average crop. On the fifth of June, I went down to the World's Fair, and remained until the sixteenth, and upon my return found the crop practically a failure. A large proportion of the fruit had blighted, and many of the plants looked to be dried up or scorched with heat, although nothing else on my place seemed to be suffering from drouth at that date. An examination showed the presence of considerable numbers of fully developed insects closely resembling "chinch bugs," and the stems and leaves showed the appearance of having been sapped of their juices by some insect. The weather for one week previous to this had been very warm, and the soil was rather dry. An examination of the roots showed that many of them were already dead and others spotted with mould, or fungus, of some sort, and some varieties were affected much worse than others. The Burpee, Louise and Warfield showed the greatest injury, and I think that more than three-fourths of the plants finally died out. The Parker Earle, Bubach No. 5, Lovetts Early and Mrs. Cleveland looked the best, with Michel, Crescent and Pearl not much behind. The Crescent and Bubach gave the most and best fruit; the Burpee, Louise, Jessie and Parker Earle the least. The Michel gave one very fair picking, but proved to be two or three days later than the Crescent.

The varieties set in 1893 for the next season's fruiting and trial are Crescent with Bederwood, and Warfield with Michel and Parker Earle. We reluctantly abandon the Jessie as of no value on our place, it having given but one satisfactory crop in six years. We also set a few plants of Greenfield, Van Deman, Saunders and Eclipse, and give Lovett, Sandoval and several others further trial.

Raspberries. Our raspberries have proved a fair success this past season. The plantation was made in the spring of 1892. The varieties are Ohio, Older, Progress, Nemaha, Johnson's

Early, and a variety of the black, of which the name was lost, and the Shaffer, Cuthbert and Marlboro of the reds. The Progress and Johnson's Early are the earliest, and the birds took the fruit faster than it ripened. The Ohio is the hardiest and strongest grower, and produced the largest crop of the blacks. Nemaha came next in productiveness, and the fruit was much finer and better for market. I think the Older may be worthy of retaining. The Shaffer appeared to be as hardy as the Ohio and even more productive. Marlboro and Cuthbert were about alike in productiveness.

A seedling yellow cap, sent to us from Michigan, bore a large crop of good sized berries, but seems to have no value for market or much for home use.

In the orchard, we have not many additions to make to our report of 1892 and previous years. The greater portion of the trees are too young to expect much fruit from. None of the trees were seriously injured last winter, or so that they did not grow from the terminal buds. There was no scab on either twig or leaf on the apple trees, and but little upon any of the Siberian species, and all have made a good season's growth of well-ripened wood. Pears showed something wrong with the foliage late in the season, and plums have been badly infested with aphids. The leaves of some of the Desotas showed little protuberences, that may have been caused by minute insects.

In our experimental orchard we have now growing over 300 trees, most of which have been planted from one to five years, but a few of them about eight years. Altogether there are about ninety varieties, about one-half being of the newer Russians, and the remainder are seedlings or but little known varieties that we have picked up in this state, Wisconsin and northern Iowa for the purpose of testing their hardiness and value. As we expect that many of them will prove utterly worthless, we are planting the rows about twenty feet apart and twelve feet apart in the row.

Of pears, we have about four varieties of Russian and one, a seedling from Geo. P. Peffer, of Pewaukee, Wis. None of them have so far fruited or shown any bloom, although some of the trees are ten years old and have never shown any fire blight in trunk or branches.

Of plums, not a single variety produced any fruit. On the third day of April, the thermometer indicated 74° in the shade for several hours, and for a day or two the weather was favorable for rapid vegetation and caused the fruit buds of the plum to show very prominent. On the nineteenth and twentieth a heavy snow fell and remained upon the ground for several days. After its disappearance the buds were mostly gone, and the trees blossomed but little. Whether the buds were injured so that they fell off or were picked off by the birds, I am not able to say, but a neighbor informed me that he saw large numbers of robins feeding upon them.

During June, berries received from the central stations in 1892 fruited very well, but, being from home at the time they ripened, the birds gathered them all, and we cannot report on their quality.

The Japanese wineberry we have found too tender for this climate, and do not consider it worth the trouble of giving it suitable winter protection.

In our nursery we have not far from 100 varieties of root grafts put in in the spring of '92 and '93, and about thirty varieties are different from any in the orchard. We design to secure scions of every seedling variety that originates in the Northwest that shows any evidence of becoming desirable for growing in any section of the state, and put in rootgrafts of them, from five to twenty of each kind. The intention is to set two or more trees of each variety in the trial orchard, and dispose of the best of the remainder, except such as are received under restrictions, where we can keep track of them. The number of seedlings so far started is about fifty varieties, about thirty of which were put in last spring. The grafts set in 1892 nearly all lived and generally made a heavy growth, and last winter discolored the tips of many varieties so that it was necessary to cut them back considerably. Varieties not injured, or the least injured, were Oldenberg, Okobena, Daisy, Good Peasant, North Star, Zuzoff, Hiberna, Golden Reinette, Ostrekoff, 4m, Patten's Greening, Charlamoff, Borovinska and five seedlings from Blue Earth county (three of these are double hybrids), and Murphy's Greening from Wisconsin. Several varieties of native plums are being propagated by root grafting.

At the request of Prof. S. B. Green we tried the sand cherry seedlings as stock for Desotas with most satisfactory results. A much larger per cent. lived than where plum stocks were used and have made fully as good a growth.

MONTEVIDEO EXPERIMENT STATION.

LYCURGUS R. MOYER, SUPT.

The past season was a very trying one at this station. A very wet spring was followed by a protracted drought, during which many of the newly set trees died; a few survived and will be reported on hereafter. Among these are *Ribes Alpinum*, *Ptelia trifoliata*, *Phellodendron amurense*, Siberian almond, *Caragana variagata*, *Berberis thunbergii*, *Elaeagnus argentea*, Siberian arbor vitae, *Acer ginnala*, Schwedler's maple, besides several varieties of plums and Russian apples. The narrow-leaved cottonwood (*Populus angustifolia*) died, much to my regret. Its native range at the foot of the Rocky Mountains would seem to indicate that it ought to succeed here.

Fraxinus. It having been my opinion for some time that the ash trees native to this part of the state are mostly green ash (*Fraxinus viridis*), I sent to Douglas for the true white ash (*Fraxinus Americana*) and shall test the two side by side. White ash trees, probably true, from Mr. Dartt, are doing well. Another ash, bought from a Wisconsin nursery as white ash, is quite tender. It probably is a European species.

Populus. Among the Russian poplars, *Populus certinensis* is the most promising. *Populus laurifolia* is also doing well. *Populus Siberica pyramidalis* is badly infested with a scale insect and is not growing any. *Populus wabski*, or 23 Riga, grows rapidly when young, but the branches are very crooked and the central shoot

grows in every direction except upright. *Populus Dudleyii*, with its long narrow leaves looking like a willow, does not promise to ever become a large tree. *Populus betulifolia* promises to become a very fine tree, slightly resembling a cottonwood, but much more airy and graceful. For a fine upright silver-foliaged tree, *Populus bolleana* promises to fill the bill. It is a noticeably fine tree. So far it shows no tendency toward root sprouting like the common silver-leaved poplar.

Salix. The crack willow (*Salix fragilis*) is doing well. For prairie planting it may not grow to be as large as the common white willow, but it grows rapidly while young, and will be valuable to vary the usual monotony of prairie planting. The rosemary willow (*Salix rosmarinifolia*), though only a shrub, grows rapidly when young. The glaucous bloom of its leaves makes it a beautiful object. A row of it planted some distance outside of a grove would be of great value to stop the snow. It grows thick and close near the ground, and if snowed under will bend over without injury. The laurel-leaved willow (*Salix laurifolia*), with its broad shining leaves, is thrifty and vigorous and full of promise. It is a strikingly handsome tree. The sharp-leaved willow (*Salix acutifolia*) is upright in growth and very promising. Napoleon's willow (*Salix Napoleonensis*) seemed to be tender when first planted here, but it has passed the two last winters in perfect condition. Its peculiar bluish foliage will make it an ornamental shrub of considerable value. *Salix vittelina* when young was tender here, but it came through the past two winters in perfect condition. Its red branches in winter make it a striking object. It will be valuable to the landscape gardener to give a dash of color to a dark shrubbery in winter. *Salix 14Vor.* seems to be identical with *Salix vittelina*. *Salix aurea* has not done well on dry bluff land, and *Salix caprea* was injured somewhat by drought or cold weather.

Hicoria. Experiments with shell-bark hickory do not indicate any great success. The tree is making very slow growth.

Gymnocladus. The Kentucky coffee tree (*Gymnocladus Canadensis*) is doing well here. This was to have been expected, for Mr. Sheldon found it growing wild as far west as Brown county. It is a fine tree.

Morus. Mulberry bushes obtained from a Wisconsin nursery as Russian mulberry, probably a variety of *Morus Tartarica*, at first seemed to be tender, but have stood the past two winters without injury, and last summer produced quite a crop of small, black fruit. The fruit would have been of some value had it ripened more evenly. The birds watched it well, and gathered the fruit about as fast as it ripened.

Elaeagnus. A species of *Elaeagnus* received from Prof. Budd under the name of *Elaeagnus angustifolia*, doubtless a variety of *E. hortensis*, as described by Loudon, is growing vigorously and seems to be entirely hardy. Its bright, shining, silvery foliage makes it a conspicuous object in any plantation. I believe it possesses much merit. It is doubtless the wild olive of the East, referred to in sacred history. It is an interesting circumstance that it proves to be hardy on the prairies of Minnesota. We have also

planted *Elaeagnus argentea*, but it is too early to report on it. It is a native of Montana, Dakota and northwestern Minnesota, and will doubtless succeed here. Experiments with *Elaeagnus longipes* are inconclusive, and I would not want to say that it is not hardy until after further trial.

Shepherdia. The buffalo berry is so strikingly like the wild olive in its general appearance that the casual observer would be apt to think it to be the same. The trees grow with the same vigor that characterizes the wild olive, and they have about the same value for ornamental planting. The trees here have not yet fruited.

Lonicera. The ordinary forms of climbing honeysuckle offered in the nurserymen's catalogues are tender here. I am glad, however, to report that one received from Prof. Budd under the name *Lonicera media* seems to be ironclad in hardiness and a rapid grower. The upright honeysuckles, including its varieties, *L. elegans* and *L. gracilis*, are all hardy, while the variety *L. splendens* is "splendid." *Lonicera Alberti* is hardy and interesting, but has not yet bloomed for me.

Philadelphus. All the mock oranges are doing well, and may be planted on the prairie anywhere with the assurance of getting a large display of beautiful white flowers. 144 Vor., of Prof. Budd, is one of the best.

Syringa. All the lilacs that I have tried seem to be of ironclad hardiness, and, really, there is no more beautiful shrub. The new Japanese tree lilac seems to be equally as hardy as the older ones.

Cornus. Our native cornel does well, and seems to be strangely like the *Cornus sanguinea* of the nurseryman. *Cornus mascula* has been disappointing so far.

Sambucus. The common wild elder, *Sambucus Canadensis*, is doing well, but is not so thrifty and vigorous as the red-berried elder, *Sambucus racemosa*. Golden elder and cut-leaved elder, varieties of the European *Sambucus nigra*, are quite tender.

Viburnum. A Russian snowball, from Prof. Budd, is doing finely, and so is the common snowball. Our native *Viburnum lentago* is one of our finest ornamental shrubs.

Ribes. The Russian currant, 148 Vor., does not differ greatly from the old fashioned yellow flowering currant. Both are valuable shrubs. A currant received from Prof. Budd, under the name of *Ribes degusna*, does not differ greatly from the wild black currant of our forests.

Prunus. *Prunus padus* greatly resembles our native choke cherry. *Prunus maackii* is somewhat similar, but starts very early in the spring. Besarabian, Suda and Ostheim cherries seem to be hardy in tree, but have not yet fruited for me. *Prunus punila* is very promising.

Besides several varieties of *Prunus Americana*, the long red plum (19 Orel) and the long blue plum (20 Orel), as well as the Russian plum, Marmika, look extremely well. The Shensi and Alexander apricots passed through last winter without injury.

Pyrus. The Russian pears Gakovska (347) and Kurlskaya (392) look very promising. The same may be said of the Russian apples.

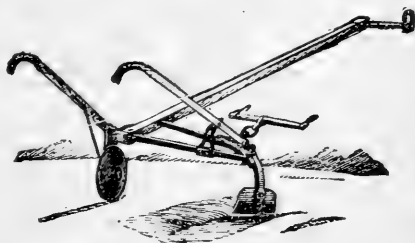
Hibernal, 322, 984, Smd. No. 1, 22 m, 987 and Antonovka. Virginia, Dartt, Greenwood, Gideon, Whitney, Powers, Martha, North Star, Sweet Russet, Hyslop and Yellow Siberian crabs look equally well. Young trees of Oldenburg and Wealthy are looking well, but the old ones have mostly failed.

Conifers. The best conifers growing at Montevideo are white spruce. Norway spruce and black spruce do not look nearly so well. The common juniper (*Juniperus Virginiana*) succeeds admirably. The balsam fir is doing surprisingly well. Colorado blue spruce (*Picea pungens*) is very promising. The dwarf mountain pine (*Pinus pumilo* and *Pinus mughus*) is one of our hardiest conifers. It is very desirable for lawn planting. It retains its bright green color through our severest winters, and is very interesting in summer, when making new growth and blooming.

THE GRAPE HOE.

(This seems to be a practical implement for many uses.—Secy'.

We show an engraving of a most useful tool in the vineyards, which was recommended by Prof. Hutt, at Peterborough, as being of so much service in the New York state vineyards. After cultivating the rows, this tool will take out all grass and weeds that remain under the wires and around the vines and posts, and will thoroughly stir the soil close to the vines. Without careful attention in driving, the hoe is guided in and out around the vines by the dirk castor wheel, to which the handle is attached. The horse is hitched to one side of the pole, which gives plenty of room for the plow to work under the vines or bushes without injury to them from the horse or the whiffle-trees. The engraving is shown by courtesy of Messrs. John H. Grout & Co., of Grimsby, Ont.—*The Canadian Horticulturist*.



Question Box.

(Please ask and answer questions briefly, and in replying, refer to the number.)

4. Have any of the members apple seed for sale, of some *good* and *hardy* sorts.

5. Do grape and apple seed have to be planted in the fall, so as to freeze? If so, where?

C. G. HIPPLE,
Bird Island, Minn.

NOTICE OF

Summer Meeting, 1894.

The Summer Meeting of the Minnesota State Horticultural Society will be held Thursday, June 21, 1894, at Villa Rosa, the residence of Mr. and Mrs. Dorilus Morrison, cor. Twenty-fourth street and Third avenue south, Minneapolis, Minn.

This meeting will be held at Villa Rosa in response to the invitation of Mr. and Mrs. Morrison tendered to the society at its last winter's meeting. The date has been selected as near as may be judged beforehand to agree with the time when the roses, that have suggested to this home its name, shall be in bloom.

In harmony with the surroundings, it is the purpose at this meeting to emphasize rose culture, and the premium list, etc., have been prepared with this object somewhat in view.

It is hoped that members of the society and both amateur and professional rose growers will contribute, as they have been favored, in making a fine exhibit.

As usual at our summer meetings, this occasion will include a basket picnic dinner (due at 1 p. m.), at which each member (and wife) attending is invited to contribute. The dinner will be followed by the announcement of awards and a meeting of a somewhat extemporaneous character, at which, among other things, you will be given an opportunity to tell what you know or don't know about the culture of the rose here or elsewhere.

The meeting throughout is to be largely informal and afford an opportunity for renewing old acquaintances and making new ones amongst the rapidly increasing membership of the society. Kindly social intercourse rather than business is its purpose.

The reception committee will be in attendance at 10 a. m.

For further information address

J. M. UNDERWOOD, Pres.,

A. W. LATHAM, Sec'y,

Lake City.

207 Kasota Block, Minneapolis.

N. B.—For premium list see next page.

PREMIUM LIST.

All exhibits must be entered with the secretary and in place by 12 M. to be entitled to compete for premiums.

Exhibitors competing must be members of this society and the growers or makers of the articles exhibited. The fruits, flowers and vegetables exhibited must have been grown in Minnesota and correctly labelled.

No premiums will be awarded on unworthy exhibits.

CUT ROSES.

Six blooms of any one of the following varieties: *Teas*—Perle, Sunset, Bride, Mermet, Bennett, Wooton, La France, Duchess of Albany, American Beauty; *Hybrid Perpetuals*—Mdm. Gabriel Luizet, Gen. Jacqueminot, Magna Charta, Paul Neyron, Crested Moss, Chas. LeFebvre, Alfred Colomb, Capt. Cristy, Mrs. J. H. Laing, Ulrich Bruner. To be shown in vases. Premiums will be awarded to each variety. First premium \$1.00; second premium, 50c.

Spray of twelve roses.....	1st premium, \$3.00; 2d premium, \$2.00
Floral design, made of roses and green,	5.00; " 3.00

STRAWBERRIES.

Each variety exhibited, 1 quart.....	1st premium, \$1.00; 2d premium, .50
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VEGETABLES.

Asparagus, three bunches.....	1st premium, \$1.00; 2d premium, .50
Beets, six.....	" 1.00 " .50
Cabbages, three.....	" 1.00 " .50
Cucumbers, six.....	" 1.00 " .50
Green peas, ½ peck.....	" 1.00 " .50
Lettuce, six.....	" 1.00 " .50
New potatoes, ½ peck.....	" 1.00 " .50
Pieplant, six.....	" 1.00 " .50
Radishes, six.....	" 1.00 " .50
Turnips, six.....	" 1.00 " .50

WISCONSIN SUMMER MEETING.—The summer meeting of the Wisconsin State Horticultural Society is to be held at Madison, Wis., June 21 and 22. An interesting program, embracing a wide range of topics, has been prepared to fill the two days session.

KNAPSACK SPRAYER.—For the information of the many inquirers for this article, I will state that I have purchased for my own use two 4 gallon sprayers (one three years ago) of Albinson & Co., Washington, D. C. Price \$10.00 They are giving me entire satisfaction.

Sec'y.

Secretary's Corner.

SUMMER MEETING.—A good attendance and pleasant time is looked for at our coming summer meeting. Any members who cannot attend and have a kindly word of greeting for us, can send it to the secretary, and it will be presented to the meeting.

PLANT PREMIUMS.—Membership fees are still coming in, and we hope will continue to through the year; but, necessarily, the premiums of plants cannot now be sent out till fall. Any who have not received all their premiums may expect them then. The extraordinary earliness of the season shortened materially the time of delivery this spring.

SPRAYING.—Special attention should have been called in the May number to the article on "Spraying" which it contains. The latest knowledge on the subject is contained in that article, well condensed, and its instructions should be closely followed by all fruit growers who are keeping up with the times.

RUSSIAN FRUITS.—F. W. Taylor, secretary of the Nebraska State Horticultural Society, has received from the Department of Agriculture an appointment as special Honorary Commissioner at the Pomological Show to be held in St. Petersburg, Russia, in September next. Mr. Taylor made a trip to that country in the interest of pomology two years since, and with this experience we shall look for a valuable report from his further investigations.

FRUIT PROSPECTS.—Responses to inquiries of members in many places in the state indicate a small damage to the fruit by frost—perhaps, 10 to 20 per cent—,with a prevailing sentiment that the loss is greater in other places. All classes of fruit have suffered in this loss, though in some localities it is mainly only on apples, in others on currants, etc. In the main, strawberries have suffered most, but with suitable weather from now on the crop is likely to be a good one.

N. B.—Later advices indicate an increasing injury, variously ascribed to frost or blight.

STATE FAIR PREMIUM LIST.—The premium list for 1894 is now out. It has been the intention to send a copy to each member of this society, and if any one has not received one and would like it please address Secretary W. F. Cross, Hamlin, Minn.

The large premiums offered for fruit—nearly twice as much as heretofore—and the probabilities of a good fruit crop make it likely that the fruit exhibit will be a fine one. Lay your plans to attend, if practicable; at least, to send your best fruit. Turn to page 41 of the premium list and read carefully.

THE MINNESOTA HORTICULTURIST.

VOL. 22

JULY, 1894.

NO. 6

Summer Meeting, 1893.

NOTICE.

The summer meeting of the Minnesota State Horticultural Society will be held Wednesday, June 28, 1893, at the State Experiment Station, St. Anthony Park, Minn.

This meeting, being held at the station, is sure to be one of much interest from the opportunity offered of looking over the experiment grounds, where a great variety of interesting and valuable work is being done in both agriculture and horticulture.

The forenoon will be spent in an examination of the grounds. At the noon hour, the members and visiting friends will sit down to a basket picnic dinner, to which each person in attendance (with his wife, of course) is invited to contribute—otherwise we feast not.

Immediately after dinner, the society will hold a session for the transaction of business and the presentation of any subject, either orally or by paper, as desired by the members present. As usual, no program has been prepared,

Among other matters of special interest will be a report from the committee on the National Rose Show, which may call for some action at this time; and a report on the Minnesota Horticultural Exhibit at the World's Fair by the superintendent in charge, Secretary A. W. Latham.

A grand good social time is assured, and the members and all friends of horticulture, who ought to be members, are very cordially invited to meet with us.

Take the Great Northern Railway trains or the electric cars from either Minneapolis or St. Paul.

Carriages will be in waiting at the Great Northern Railway depot during the forenoon to furnish conveyance to the grounds, one mile away.

For further information address

	J. M. UNDERWOOD, President,
A. W. LATHAM, Secretary,	Lake City.
Excelsior.	

PREMIUM LIST.

Articles exhibited must be grown by exhibitor.

FLOWERS.		1st Prem.	2d Prem.
Collection of cut roses.....		\$3.00	\$2.00
Collection of cut pansies.....		3.00	2.00
Collection of cut carnations.....		3.00	2.00
Floral design.....		5.00	3.00
Hand bouquet.....		2.00	1.00
FRUITS.			
Strawberries—Collection of not less than three named varieties, one quart each.....		3.00	2.00
Largest fruit of any one variety, one quart.....		2.00	1.00
Minnesota seedling, not before exhibited.....		2.00	1.00
VEGETABLES.			
Collection, not less than six kinds.....		3.00	2.00
Asparagus, three bunches.....		1.00	.50
Beets, six.....		1.00	.50
Carrots, six.....		1.00	.50
Onions, six.....		1.00	.50
Radishes, six.....		1.00	.50
Turnips, six.....		1.00	.50
Pieplant, six stalks.....		1.00	.50
Lettuce, six heads.....		1.00	.50
Cabbage, three heads.....		1.00	.50
Cauliflower, three heads.....		1.00	.50
Green peas, half peck.....		1.00	.50
String beans, half peck.....		1.00	.50
New potatoes, half peck.....		1.00	.50
Cucumbers, six.....		1.00	.50
Summer squash, six.....		1.00	.50

RULES.

All exhibits must be in place by 1 p. m. The awarding committee will have power to recommend special premiums on seedlings and articles of special merit in fruits, flowers or vegetables, not provided for in the schedule of premiums. *Premiums will not be awarded to articles unworthy of exhibition, even if there is no competition.*

Competition will be open to all, but the annual membership fee of one dollar will be deducted from premiums awarded to persons who are not members of the society.

SUMMER MEETING, 1893.

The meeting was in the nature of a basket picnic and was held in the grove at the St. Anthony Park Experiment Station, June 28, 1893. The morning was devoted to an interchange of friendly greetings; an examination of the experiment grounds; to the arrangement and examination of the fruits, flowers and vegetables entered for competition and to the award of premiums; and closed by ample appreciation of the bountiful picnic dinner, to which all had contributed.

The afternoon session, still under the trees, began at two o'clock with Pres. Underwood in the chair. The program was impromptu, and was opened by a few words of greeting from the president.

He spoke of the pleasant memories connected with last summer's meeting at Lake City and wished that he might always welcome the society there; of the pleasure of meeting in such a beautiful spot and of the gratification of watching the experiments going on at this farm; of the pressure of work upon the horticulturist at this

season, making it difficult to leave the duties at home, and, hence, the lack of time for conference regarding the weightier matters in which all were interested. That must come in the winter, but at this time the meeting should be more for pleasure, so, while he had invited a few to respond to certain sentiments, he wished all to feel free to speak on these or any other subjects in which they were interested.

Prof. S. B. Green was first called upon to say something of "Horticulture on the State Farm." By his earnestness, the professor won the attention of all as he "talked a little bit of common sense in his line of work." He thanked the visitors for their criticisms, expressing a hope that he would profit by them, and then spoke somewhat as follows:

"I consider that in this northern country the most important thing we can do is to carry on new experiments, especially in apples. We have between 250 and 300 varieties in the experiment orchard. These cannot look like an orchard that is all of one kind and hardy. The fact that some trees have died over there, shows that we are learning something. Variety testing and seedling work with apples is most important. We are raising a great many seedlings each year, and we propose to raise as many varieties as possible, experimenting largely with Russian apples.

We are also paying especial attention to plums, having some 3,000 seedlings. We shall select the best and put them with newer kinds. We have fifty named varieties. We are also testing thirty-five kinds of raspberries, and have sixty or seventy named varieties of strawberries, besides some 700 seedlings, some of which are quite promising. Then, we are carrying on variety testing and seedling work with grapes, having forty-five different kinds. These are not a lot of old varieties, kept just to say we have a quantity. We have thrown away a great many. In blackberries and gooseberries and currants, we are also working.

Then, there is the sand cherry, a fruit especially adapted to this state, although it has received little attention, as yet. It is useful for fruit and for wine. We have five varieties of the Juneberry and are trying the buffalo berry, though this will probably never be popular where the currant is grown successfully.

We have a group of trees called our forestry plantation. This contains all the different kinds of trees that I consider adapted to the different sections of this state, and we are trying to show the young men their real value as windbreaks and for other purposes.

We are trying cherries from Russia; and I have an idea that Russian cherries have come to stay.

With our ornamental plants, we have labeled one plant of every kind on the ground. In this way our young men or visitors can see them as they pass along and thus become familiar with the names.

I have been surprised at the interest taken in horticulture in this section. Farmers are eager for fruit and something green to eat. When a farmer depends on buying his fruit, he does not, as a rule, get any. I believe there is a great future for northern horticulture. We cannot look to other states for precedents. We must build up a system of our own, adapted to this state and the Northwest."

Col. J. H. Stevens was called upon to say something about "The Most Perfect Apple Tree of the North," a beautiful tree, planted twenty-three years ago. He spoke of the great work Minnesota had accomplished under very discouraging circumstances; of her many attempts and failures, with once in a while a success.

He was pained to hear that those states where they raise apples almost spontaneously have no exhibits at Chicago, viz: Pennsylvania, Kentucky, and others have no displays, while Minnesota is well represented. All of which goes to show that people who have the hardest labor to accomplish anything are always most successful. New England has a hard time, but is most prosperous. So with Minnesota. He thought we were going to persevere until we had fruit to send out into the country.

The tree of which he was called to speak is a Duchess, planted in his garden some twenty-three years ago. He said it was a pretty healthy tree yet, showing that the Duchess is a long-lived tree.

Mr. Wyman Elliot responded to the sentiment, "The Lessons of the Season." He said: "The lessons of the season will, perhaps, teach us that we do not understand all the ways of nature. We have thought in the past that we knew how to do this and how to do that, but when we come to consider what the past winter has done for many of us in the way of injuring our trees, etc., we find that we do not know it all. Our roses were killed, and many horticulturists lost their small fruits. Even in the Minnetonka region, where we supposed the lake was a protection, it was no better. We have many things yet to learn, and we ought to pick up everything we can. Today I have learned many things in regard to strawberries, that I thought I knew pretty well how to treat. When I came here last August and saw how they were managing the strawberries after the fruiting season, I questioned whether that was the best way; but when I come here today and see the result, I know the methods were right, and shall remember them. Good cultivation and plenty of mulching are what lead to success."

"Vigilance, the Price of Success," was responded to by Mr. Wm. Danforth, of Red Wing. He spoke of the work all had to go through to make the twenty-four hours meet. Although a civil engineer, he devoted some time to the cultivation of fruits, having two acres each of strawberries and raspberries. According to his estimate, a man should receive from three to five hundred dollars from an acre of raspberries. He emphasized the importance of mulching, and himself considers clover the most valuable thing for the purpose. "I find," he said in closing, "that in order to make a success of anything in the world, work is its price, or, as the president called it, vigilance."

At the conclusion of Mr. Danforth's remarks, a discussion followed regarding the value of mulching, in which Mr. Brackett, who had recently visited Mr. Thayer's fruit farm at Sparta, Wis., referred to his using red clover in mulching his raspberries and blackberries. Mr. Brackett reported that Mr. Thayer thinks marsh hay of almost as much value for mulching as red clover. The reason why he does not use it, is because it is not abundant in his neighborhood.

If he could get it as readily as we can in this region, he thought Mr. Thayer would use it for all purposes, rather than pay eight dollars a ton or more for the clover.

The president then called on Secretary Latham to make a report of his work in Chicago, responding to the sentiment, "The World's Fair. We don't take a back seat." Secretary Latham reported as follows: (This report will be found with the other World's Fair papers. See index.)

"The Flowers; Nature's Contribution to the *Æsthetic* in Man," was responded to by Miss Emma V. White. "There is a poem which describes God as creating the universe, and, although pleased, he felt that something was lacking. So he made man to enjoy and govern his creation. He looked upon man and was pleased with his work, but still something was lacking. Then he made the flowers to beautify and adorn his former creation, and to complete and to satisfy the love of the beautiful in man. And so the flowers came to us as a joy, lighting up the sick room, adorning our grounds, appealing always to our love of the beautiful. We are told to distrust that man who has no music in his soul; that he is fit for treason, stratagems and spoils. Possibly, this is not too strong a statement to make of him who does not love the flowers, and I am glad to see that the young men who are receiving their training at the Agricultural School are not having this portion of their nature neglected.

On an occasion like this, however, it is a witty speech that is best appreciated. While I cannot give you the wit, I can give you, perhaps, that which is better—the soul of wit—brevity."

Dr. M. M. Frisselle was called upon to say something of "Our National Flower; What Shall It Be?" "Flowers have always played an important part in man's life and history. In ancient times they were dedicated to the heathen gods, the cherry to Apollo, lily to Juno, myrtle to Venus, narcissus to Ceres, and the vine to Bacchus. Later, in the history of the church, the saints had their flowers, the canterbury bell! was dedicated to St. Augustine, the daisy to Margaret, the crocus to Valentine, the rose to Mary Magdalene. Various countries, too, have their national emblems; in France, the fleur de lis; in Ireland, the shamrock; Prussia, the linden; England, the rose; Spain, the pomegranate, and Scotland the thistle. Why should not our country have its national flower? There is our maize, indigenous to this country, but that is good for corn bread. The rose is beautiful, but that is England's flower, and has been the cause of bloody wars, the "War of the Roses" cost England many lives. But the flower which I think would be best adapted to our country is the golden rod. It is universal, being found from the bleak hills of New Hampshire to the Gulf. It is a beautiful and a significant flower. There are forty-nine kinds of golden rod, and only five of these belong to foreign countries. For these reasons, it is most proper as our national emblem. It does not come in early spring or midsummer like the rose, but late in September and October, when other flowers are gone. The frosts do not destroy it, in this it is emblematic of our nation. We have set the example of liberty, and our flower should be an emblem of permanence in our institutions."

Some discussion and witty sallies followed the remarks of Dr. Frisselle. It was suggested that while the golden rod might do for a national flower, "Pillsbury's Best" might be appropriated for Minnesota; that, perhaps, the remarks in the "Arena" about corn may mean after it's ground; or that, perhaps, one reason why golden rod is likely to be popular, is because silver will probably be demonezitized.

In order that the ladies might have more of a part in the deliberations, the president proposed that a vote should be taken as to the preference of the meeting. A motion was accordingly made by Mrs. Latham that we approve of the golden rod as our national flower. This called forth further discussion. Mr. Harris could not vote for the golden rod in view of our beautiful wild apple. Mr. Gould thought this on a par with adorning one's ground with the Lombardy poplar. It does very well, if you look at it a half a mile away. A rising vote was finally taken, a very large majority sustaining the motion.

Mr. C. D. Smith, director of the experiment station, spoke of "The Relation of the Dairy to Horticulture." In substance he said: "As to the relation of the cow to horticulture, I find it a very pleasant and instructive one. It furnishes cream for the berries; it furnishes the stuff while you furnish the aesthetics. When a dairyman has made his money at the really hard labor of the farm, he sells out to go into horticulture. If the cow could talk and vote, she would vote for corn. If she could enter into the spirit of it, it would affect her, even to the tail, which becomes very 'whisky.'"

I have been more than delighted with the advance in horticulture that I have seen in visiting the fairs in the southern parts of this state. I am going to tell you a story to illustrate how I felt about the knack of Minnesota horticulturists when I saw what others can do against odds. When I was in the extreme South we put up an ice machine. The negroes said we couldn't make ice in hot weather. But when we were successful, I asked a negro what he thought of it. He said we could beat the Almighty, for he could make ice only in the winter. That's the case with Minnesota horticulturists. They went down to New Orleans and took the prizes there.

I am glad to see you here to enjoy with us the fruits of Prof. Green's labor. Our work is all closely allied. How closely allied, for instance, is that of the entomologist to the raising of small fruits! In the vegetable line, also, he assists the horticulturist. Think of the potato rot and the potato scab. How the entomologist has studied them, and enabled you to prevent the destructive insects!

We are glad to see you here today, and when you come alone will be pleased to welcome you, also, to any of our departments.

"Bugs in Horticulture" by Prof. Otto Lugger. The professor spoke first of the beneficial influence of bugs, calling attention to the fact that we could not grow flowers without insects. He spoke also of their injurious effects and of the many substances on the market advertised as insect destroyers, oftentimes in themselves more injurious to the plants than the insects. The other day he re-

ceived one with the high-sounding name, "Oriental Fertilizer," an insect destroyer that would make plum trees bear every year; kill all injurious insects but no others; kill all the diseases of the tree—and all for seventy-five cents. He was foolish enough to try the experiment on his own trees, instead of those of the station, and found it killed them inside of two hours. These things on the market are generally useless and expensive. But with proper knowledge it is generally possible to kill the injurious kinds of insects.

Prof. Harry Snyder responded to the topic, "Chemistry in Horticulture." Mr. Snyder spoke of the beginnings of organic chemistry; of their following the mysteries of the black art, alchemy, and how even now the science and its application to horticulture and other arts, is retarded by superstitions still lingering from the old, old beliefs. In New England there's a week known as the — week in September, and the farmers believe that potatoes dug in this week will be better. But these are disappearing, and the chemist is able to do much to assist the farmer and the horticulturist. He can even produce in the laboratory the flavors of the various fruits. Mr. Snyder closed by giving to the members a hearty invitation to send to the Experimental School at any time when they needed assistance in regard to injurious insects, soils, methods, etc., assuring them that their requests would receive willing and gratuitous attention.

Mr. C. W. Sampson, who spent last winter in California, was called upon to speak on "What Most Interested me in Pomona." Leaving the banks of Lake Minnetonka in September, when fall had begun to hold sway, the change to lower California was almost like going into the Garden of Eden. Notwithstanding this beauty, and the profusion of crops, Mr. Sampson prefers to remain in Minnesota and try for a few years longer what he can do in small fruits. Aside from oranges, he thinks the quality of our fruit is far ahead that of California.

At this point Col. Stevens offered a motion, thanking Professors Smith and Green and their families for their very pleasant and gracious hospitality, which was warmly seconded by all present.

Mr. J. W. Manning, an extensive fruit grower of Reading, Mass., was present and the president called upon him to speak of "The Beauties of Horticulture, viewed from Nova Scotia and the Great Lakes to the Gulf of Mexico." Mr. Manning said this was a wide field, but he had been there. He spoke of the universal cultivation of the strawberry, having eaten it as gathered by the Indians on the banks of the Saginaw, and enjoyed the luxury of the fruit at Galveston, Texas. It seemed strange to hear him say that it had been but a comparatively short time since this fruit began to be cultivated in gardens and that, in this time, nothing had been gained in quality. The speaker referred to the various changes and new plants introduced in his day, the Norway spruce, numberless varieties of apples, the roses, and the multiplying of varieties in many lines. The hour was getting late and many were leaving as Mr. Manning was speaking, which led him, doubtless to cut short his remarks, a fact to be regretted, as a man of such wide experience must have had much of value and interest to relate.

Just before the close of the exercises, Mr. Grimes introduced resolutions regarding the Sunday closing of the Minnesota Exhibits at the World's Fair; Mr. Elliot moved that these be adopted which was seconded and carried. They were as follows:

Resolved, That this society deprecate the position of the Columbian Exposition in opening its gates on Sunday, and note with regret the attitude of the board in charge of the Minnesota exhibits in causing our state building to be kept open and in requiring those in charge of the various state exhibits to be present on that day.

Resolved, That, in conformity with what we believe to be the better sentiment of this state, we respectfully urge the Minnesota Board of World's Fair Commissioners to keep the Minnesota State Building, and as far as practicable, all state exhibits closed on Sunday; and that, especially, the sentiment of this society be regarded as respects the Minnesota Horticultural Exhibit, towards the maintenance of which we are contributing of our time and products.

Resolved, That a copy of these resolutions be transmitted to each member of the Minnesota Board of World's Fair Commissioners.

AWARD OF PREMIUMS.

FLOWERS.

Article.	Exhibitor.	Prem.	Amount.
Cut roses.....	F. G. Gould.....	2	\$2.00
Cut carnations.....	F. G. Gould.....	2	2.00
Hand bouquet.....	F. G. Gould.....	1	2.00
Cut roses.....	E. Nagel & Co.....	1	3.00
Col. cut carnations.....	E. Nagel & Co.....	1	3.00
Floral design.....	E. Nagel & Co.....	1	5.00
Cut sweet peas.....	Dr. M. M. Frisselle	Recommended	
Hand boquet	Wm. Lyons.....	2	1.00
Floral design	Mrs. F. Allyn.....	2	3.00

MRS. D. F. POLK,

CLARA L. HAZELTON, Committee.

VEGETABLES.

Asparagus.....	Wm. Mackintosh & Son...	1	1.00
Coll. Vegetables.....	E. A. Ostergren.....	1	3.00
Beets.....	E. A. Ostergren.....	1	1.00
Pieplant	E. A. Ostergren.....	2	.50
Cabbage	E. A. Ostergren.....	1	1.00
Cauliflower	E. A. Ostergren.....	1	1.00
Cucumbers	E. A. Ostergren.....	1	1.00
Lettuce.....	J. R. Cummins	1	1.00
Pieplant	Wm. Lyons..	1	1.00
Asparagus.....	Wm. Lyons.....	2	.50
Peas.....	Wm. Lyons.....	1	1.00

JOSHUA ALLYN,

WM. DANFORTH, Committee.

STRAWBERRIES.

Crescent.....	Wm. Mackintosh & Son...	1	2.00
Chas. Downing.	Wm. Macintosh & Son	1	2.00
Warfield.....	J. M. Underwood	1	2.00
Belmont	J. M. Underwood	1	2.00
Jessie	J. M. Underwood	1	2.00
Sharpless.....	J. M. Underwood	1	2.00
Collection.....	J. M. Underwood	1	3.00
Capt. Jack.....	L. E. Day.....	1	2.00
Parker Earle	J. R. Cummins	1	2.00
Martha.....	Wm. Lyons	1	2.00
Wilson	Wm. Lyons	1	2.00
Crescent.....	Wm. Lyons	2	1.00
Bubach.....	Wm. Danforth	1	2.00
Warfield	Wm. Danforth	2	1.00
Monarch.....	Wm. Danforth	1	2.00
Nichols Early.....	Wm. Danforth	1	2.00

J. S. HARRIS, Committee.

Lost \$200,000.—In his practical lecture, held in Minneapolis, Friday morning, Feb. 23, before the Farmers' Institute, Hon. Geo. T. Powell, speaking on "Fertility of Soil," dwelt with great earnestness upon the absolute necessity of planting forest trees for the purpose of enriching the soil with the fertilizing properties of decayed vegetation, and with moisture, which the farmer must have for his plants or fail of a crop. He also emphasized the commercial value of trees, constantly rising in price all over the country, owing to the almost universal scarcity; and illustrated his statement with an incident that occurred in Indiana.

In early years when the farm was developing to be something, the farmer referred to, planted four young black walnuts. Under proper treatment they grew well and at last became magnificent trees, vast and clean in trunk and limbs, bearing delicious nuts every year. About this time a lumber-dealing gentleman, having observed them, one day offered the owner fifty dollars each, if he would cut them down for market. Though hard pressed for money, the farmer declined the offer. A few hours after, returning home, the farmer said:

"Wife, I have lost \$200,000 to day."

"How can that be," she laughed, "when you never had so much in your life?"

"Here he related the offer of the lumberman, adding, "If when I planted those four walnuts, I had been sensible enough to have planted four thousand such, don't you see I would today be worth \$200,000?"—*Progressive Age*.

Vegetables.

POTATO CULTURE.

B. T. WILCOX, HASTINGS.

In the cultivation of the potato in a location accessible to railroads, we have the assurance of a profitable cash market with the same or greater certainty as the grain grower or dairyman have for their products, for the higher quality or best varieties well grown in our climate—and none but the best varieties should be grown at all—insure them ready sale in competition with poor Southern grown stock. Low freight rates enable us to lay them down in many consumption markets cheaper than they can be produced by local or near-by growers.

In methods of culture, every grower usually has a way which he considers best; so it will only be necessary to suggest a few details which have an influence on results, just in proportion to the favorable or adverse climatic conditions which the season may develop. Soil and methods that would have succeeded in producing a profitable crop in 1892 were entirely inadequate to resist the drought of 1893, and, consequently, in our locality, the last season's crop was not more than twenty per cent. or twenty-five per cent. of the preceding one, and many acres where cultivation had been neglected were not worth digging. Four-fifths of our soil is too light, dry and sandy for potato growing, and we have found it profitable to pay as high as five dollars to ten dollars per acre for the use of the best rather than use our own for that purpose.

With the best naturally heavy, strong, moist soil, well drained and plowed deep, we should employ clean thorough culture, and use the best seed and varieties. While machinery for cutting, planting and digging may be profitable on a large scale, I have never used it in growing ten acres or less, and don't think I will at present.

Prior to 1893, we had always planted in drills, three feet apart, placing the seed one foot apart in the row, or 14,520 pieces per acre, which will require over fifteen bushels of seed, if the pieces average one ounce apiece. But I am fully satisfied this is not the best way, and shall hereafter use fifteen or twenty bushels of seed cut into larger pieces and planted thirty inches apart each way, or 6,970 hills per acre.

With four acres of the White Star planted in this way, five inches deep in the furrow, harrowed twice after planting, before they came up, and cross-cultivated three times each way, we secured a much larger crop at a less expense than was produced in the balance of this field, where they were planted in drills, cultivated and hoed in the old way. Besides, this field is absolutely clean at the present time, while it was so covered with weeds when I rented it last spring that we could not plow it until they had been broken down and burned off.

In regard to varieties for home use: For an extra early, the Ohio has maintained the lead for a long time, but we find Burpee's Early to equal it in earliness and, by far, superior in yield and quality. Lee's Favorite yields well, and is of fine quality and a week or two later. We anticipate great things from the much lauded Freeman, both for home and market purposes. For general crop and for market purposes we should grow but one kind, and should select some vigorous and productive long white variety; and which of them is most profitable under all conclusions, it would be hard to say. We have succeeded well with the White Star and shall hold to it until we find a better one and shall continue to test the most promising new ones until we find it. Both the Potenta and Rural New Yorker have made many friends in the last two years, and the first of these is all that could be desired for table and keeping quantities; both yield well, but are too round to sell well for shipment; while the Stars are too long and slim. But both may be improved to a limited extent by a careful selection of the best formed tubers for seed purposes.

Dr. Frisselle: I am very much interested in Mr. Wilcox' paper on potato growing. I was up in the northern part of the state early in the winter, and there I found to my surprise the people were almost entirely engaged in potato culture, and they were making a very good thing of it. I found the hotels in those towns full of potato buyers from the South, from St. Louis. They were shipping potatoes from those points entirely to the South, and the farmers were making a very good thing of it, selling them for thirty-five to forty cents per bushel; and all along the stations there were immense store-houses built to protect the potatoes from frost. They were brought there by farmers for a distance of ten to fifteen miles and sold to those buyers, who shipped them South. I was surprised to learn that there was such an enormous amount of potatoes shipped from this state to the South, and I was also surprised to learn that they were shipped there for seed. One agent told me that the seed from Minnesota was the only seed they used in Missouri for growing potatoes. They cannot use their own seed at all.

VEGETABLES.

W. G. BEARDSLEY, ST. LOUIS PARK.

I was very much surprised when I saw my name on that committee, and I must say that I have been negligent in the duty of preparing a report on that subject, but I trust that Brother Sampson will have a paper that will cover all points necessary.

I will say that our season has been a good deal like the fruit season; it has been rather against us in one sense of the word. We

started out with a late season, very late. You remember the storm of the 21st and 22nd of April was the severest storm we had, and by the time we got our crops in, it was very late. We started out with pretty fair success, but, you remember, about the first of June our dry season commenced, and it cut our crops short in many instances. Of early cabbage, our crop was very light. Our peas were almost a failure, especially those on sandy land, which were an entire failure. Our onion crop was a very fair one; they matured very nicely. I think we had a better crop than we had the year before in quality, but not in quantity. The later crops of the season from the latter part of May up to the 10th of June, such as beets, beans and one thing and another, were almost an entire failure. We had to depend almost entirely upon our later crop, unless the crop was sowed early. Those that sowed early got a fair crop. In our late cabbage we were detained in planting; where we ought to have put in our late crop from the 15th to the latter part of June, the majority of the crop was put in as late as the 10th of July; the effect was that it made a very late crop that was not good enough to keep, and there was scarcely any cabbage on the market that would keep through the winter.

I have a little idea in connection with this subject; I made a little list of what we would call a "farmer's garden." I have heard two or three mentioning the fact that they thought a crop of small fruits was a great promoter of harmony in the household, and I think the farmer's garden is a success in that direction, also. My idea is to take an acre of ground and lay it out twenty rods long and eight rods wide, and plant the coarser varieties from two to three feet apart, such as peas, etc.; and I want to say right here that a farmer's garden is not a garden until you have a bed of asparagus and pie-plant in it. Starting with that, you can carry a farmer's family in nice shape through the season, from that down to peas, radishes and everything of that kind, which can be raised very easily with an hour's work each day. And I venture the ladies of the house will learn to highly appreciate it in getting up a meal for their hired help.

TOMATO CULTURE IN THE MARKET GARDEN.

J. A. SAMPSON, EXCELSIOR.

Tomatoes are both fruit and vegetable. The vast amount of tomatoes grown and marketed show how staple they are as a food. I retail my first tomatoes of the season at ten cents per pound. I generally plant or set out about an acre of tomatoes each season, and figure on an income of one hundred dollars from them. My customers buy green tomatoes to cook into pies mixed with green apples; they buy them ripe to use on the table sliced and served with vinegar and sugar, or with sugar and cream, or with pepper and salt; they buy them to fry or to stew with broken pieces of bread; they buy them to make into catsup or to can for winter; they buy them green to make into piccalilli or to make into straight tomato pickles; they buy them ripe to eat from the hand, as one would

eat an apple—and you might often see your humble servant, while delivering vegetables during the months of August and September, sitting on his wagon with the lines in one hand and a tomato in the other, probably as much interested in the tomato as he was in driving his team.

You might ask what all this has to do with tomato culture, to which I will say that it has much to do with it, for it shows the demand for the culture, and selling is a very important part. Having found the demand, I must go to producing, and will commence by planting the seed in my little greenhouse about the first of March, and when they become large enough I will transplant them, setting them about three inches apart. In about three weeks they will be crowding each other again, so during some stormy day, when it is unpleasant to work outside, I will reset them and put them about six inches apart. I often transplant my tomato plants four or five times before placing them in the field. For setting out, I select a piece of ground that slopes to the south or southeast, if possible, and plant in rows about five feet apart and four feet apart in the row, except the Dwarf Champion, which can be planted closer together.

For varieties, I use the Livingston's Perfection and Dwarf Champion as general crop, and Yellow Pear and Yellow Apple as extras. I select my seed from the choicest of the first picking. I will say in conclusion, that for the culture of tomatoes I take a horse and cultivator and cultivate them, or have one of my hired men do it for me.

DISCUSSION.

Col. Stevens: Have you ever used the Acme?

Mr. Sampson: I am glad you brought that up. The black rot has been so destructive to the Acme that I had to discard it on account of the lack of sufficient fruit. The Livingston's Perfection I grow from my own seed; they are very near the original, and they are about as fine a tomato for my use as I can find.

Mr. Fuller: Some years ago I met an old gentleman who told me he had the best tomato in the world. He gave me one. It was of a deep color, round, smooth and meaty, and I agreed with him that it was one of the best tomatoes I ever saw. Last year it was the only tomato out our way that was worth anything. I saved the seed until last spring, when I put it in such a safe place that I could not find it. Now, what is the name of that tomato?

Mr. Beardsley: We call that the Mikado tomato. I bought some of that seed last spring, and it was of no account at all.

Mr. Fuller: He also gave me some sweet corn that he said was the finest in the world. The ears were not so large, but it was the sweetest corn I ever tasted.

Mr. Beardsley: It probably was the Excelsior. I want to say that I take a little exception to Mr. Sampson's paper on tomatoes. He says he transplants about three inches apart. That is all well enough in a greenhouse, if you have lots of room. We, as gardeners, make a bed of fine manure and on that place our hotbed. Some use quart fruit boxes to set their plants in. When I use them, I set them right on this fine manure, and then our tomato stalks get very heavy and stocky. In that way it makes them about four inches apart each way; and then we take them up and slip the dirt out of the boxes and set that lump of dirt right in the ground; that is, we have one tomato plant in a box. I find that a very successful plan. I hate to see Mr. Sampson go back on the Acme tomato as bad as he does, because that is our standard tomato. We have to grow a tomato for color. We take a light tomato on the market, and, no matter how pretty it is, we cannot sell it. The Acme has just the color that will sell it. I raise the Acme tomato, and I have no trouble with the rot.

Mr. Pearce: We are very much interested in tomatoes where I live. The trouble with the Acme is they come too late. There may be something in the way the Acme is handled, but, as a rule, the early fruit has rotted and continued to rot right along; and I have discarded them.

Col. Stevens: For the last four or five years I have attended the market place pretty punctually, and I have never seen a rotten one.

Mr. Harris: If seed is kept properly, it will grow ten years after, anyway. I find, however, it is not a safe rule to follow, because it takes a certain length of time to establish a new variety and get it fixed as a permanent thing.

Mr. Beardsley: Yesterday afternoon in sitting here we heard about apple trees on paper. We have a great many seedsmen who sell seeds on paper. I think it is a very simple matter for a man who has a good tomato to pick out his choice tomatoes and take out the seed, and it is a very simple matter to wash those seeds out, and I think it is the way to keep our seeds pure. We have got lots of paper seedsmen.

Mr. Brackett: What kind of tomatoes are they using at the canning establishment at La Crosse?

Mr. Harris: Livingston's Perfection.

VEGETABLES.

J. A. SAMPSON, EXCELSIOR.

Having followed gardening for a number of years, I can say that the word "vegetables" interests me whenever I hear it mentioned or see it in print. I started gardening in my present location with the intention of soon becoming a fruit grower to such an extent that I could drop gardening with safety and rely wholly on fruit; but as a mother clings fondly to the child for which she has cared, so I have a fondness for the garden.

Each season has its peculiarities; the past season's peculiarity was a drought sufficient to seriously interfere with the growth of many varieties of vegetables, and when I say "vegetables" I have to stop and think of what that implies. There are so many good things to grow in the line of vegetables, and so many varieties of each kind, that the theme is a vast one. I will begin with the first vegetable of the season.

Asparagus.—The demand for asparagus is on the increase, and no garden is complete without it. It resembles green peas in flavor and is easy to grow, in fact, after a bed is once started it is not an easy matter to destroy it. I should advise planting it in one or more long rows instead of a small bed, so that it can be cultivated with a horse. Put the rows about four or five feet apart, and set it so that the crowns are four to six inches under the ground when covered up; then let it grow about two years before cutting. I cut it about two inches under the ground when the stalks are about five inches high, taking everything clean that is tall enough, until about the first of June. Then I leave one or more stalks in each hill to grow and keep life in the roots, and quit cutting about the first of July.

Beans.—The Black Wax bean is considered a standard variety for string; some like the Golden Wax, which is choice but does not keep tender as long as the Black. There are several other varieties for string that are good, and in some locations may be best.

For a shell bean, I use the Butter, or Case Knife, and the German Lima with good satisfaction, either of which is a pole bean. The Bush Lima does not prosper well as a market bean, except that the seedmen get a good harvest out of it; which shows the demand for a bush bean suited for the market as a shell bean.

Beets.—After considerable experimenting, I have concluded that the Eclipse is the best garden beet, so far. It is well to plant two or three successions at intervals through the summer, so as not to be out of nice tender beets of medium size. The Early Blood Turnip beet is choice for general use. I plant with a seeder, in rows about two feet apart, and thin out when large enough for greens.

Sweet Corn.—I hardly need to eulogize sweet corn. It is a standard vegetable for the home garden and the market, and many a farmer has sold the surplus sweet corn so as to have a profit, besides having a good supply for the home and a lot of choice fodder for the cows to turn into milk and butter. The Cory and Marblehead are the earliest varieties, and might be called one and the same as they are so near alike. There is not much sweetness to either variety. About eight days later comes the Early Minnesota, a very choice early

variety of medium size. I seldom use any sweet corn on my table until the Early Minnesota is large enough to use. The variety which I plant in succession for late is the Excelsior, the best in quality that I know of. I use care in planting corn, so as not to have it near field corn or pop corn, either of which would spoil my stock for seed by hybridizing. There are many varieties advertised, but I have simply mentioned my selection.

Cucumbers.—They are freely grown by the gardeners and often yield a good profit. The White Spine is the standard; the Early Cluster is the best for small pickles.

Cabbages.—A green worm, called the cabbage worm, has been a great hinderance to the growing of cabbages. By experimenting, I have found that fine black pepper sprinkled on the cabbages will kill the worms. The Early Jersey Wakefield is a standard early variety and the Brunswick, or Deep Head, for fall and winter.

Cauliflower.—The cauliflower is not easy to grow, unless you have rich damp ground for them. They should be started in a hotbed or greenhouse in April. The Snowball and Gilt Edge are good varieties.

Celery.—Having had some added experience since my article on celery some two years ago, I will say that experimenting in celery growing is the best way to find out how to take care of it. I say it for the benefit of any who may intend to plant on a large scale, that they had best experiment a little. There is money in celery—that is, you must put money in it in order to grow it, to the extent of about two hundred dollars to the acre; then, if you have a good crop and can keep it until the proper time without heating or freezing or getting rusty, and then can trim it, wash and bunch it, and send it to the right market, you stand a chance of making one hundred per cent or more as profit.

One year ago my celery got frosted before I put it into the trench for winter; so, the past season, having over an acre of choice celery, I concluded to get ahead of the frost by being on time; so, noting the indications of a hard frost, I put a crew of about six men to putting the celery in trenches. After six days of hard work the job was complete, and I concluded it could freeze if it wanted to, and sort of wished that it would, but the weather had changed its mind to the extent of giving a light frost and then clouding up and thoroughly drenching the ground with rain. Then followed about two weeks of hot weather; the rain and the heat combined spoiled about three-fourths of my celery. In conclusion on the celery subject, I will say that I intend to make money growing celery.

Melons.—The question may arise in your minds as to whether melons are vegetables or fruit, nevertheless, I will term them as vegetables. The melons were somewhat smaller the past season than usual on account of the drought, but the quality was up to the standard in my garden. For muskmelons, I grow principally a variety similar to the Surprise for yellow, and a variety similar to the Pineapple for green.

For watermelons I consider the Cuban Queen as good a variety as can be found for Minnesota.

Peas.—Green peas, are one of the choicest vegetables grown, and if you please, I would like a dish of them almost any day. Good, nice, tender green peas, properly served, will please almost any one. I can imagine your mouths watering for some, as I call your attention to them.

There are so many good varieties of peas to grow that it is hard to select what is best. The Gem pea is a standard variety for medium early. I plant the dwarf varieties in rows about two feet apart, and the tall varieties in rows about three feet apart. The mildew is a great hindrance to pea culture.

Radishes.—It will surprise you for me to say that my income from radishes exceeds \$75.00 annually. I have a variety that I have kept for the past ten or twelve years; they are oval-shaped, rose-colored and of a good flavor. I plant a succession about once a week during the summer, so as to have a constant supply of radishes that are crisp and tender.

DISCUSSION.

Mr. Beardsley: Mr. Sampson has a good variety of late peas, but when he strikes off the Little Gem from the later varieties, or the Telephone, I cannot agree with him, that is our standard variety. In beans we use what we call Wardwell's Kidney Wax beans, and any one with a small amount of that variety planted will get a large crop. In sweet corn we have a variety that comes in between the early varieties and Stowell's Evergreen, but we do not think much of the Excelsior.

Mr. Sampson: I notice the gentleman takes exception to my using the Excelsior sweet corn for planting in succession, as a late variety. I know of no better sweet corn than the Excelsior, and consumers agree with me on that point. A gentleman out my way had been growing the Black Mexican corn, and any one who is acquainted with that variety knows it is very choice. He happened to be taking dinner at some place where they had some of my Excelsior sweet corn on the table, and when I saw him a few days later he wanted to get some of that sweet corn which he had tasted at that table. He said he had the Black Mexican and thought he had the best sweet corn that was grown, but he considered the Excelsior superior to that. I furnish the best customers I have in Excelsior with Excelsior corn, and I have received a great deal of praise for that variety.

Mr. Pearce: I think the Excelsior is the finest sweet corn and the best that grows. It has a white cob, and a white cob corn is always superior. It is exceedingly sweet, and the only objection I have to it is, that it is too late. It is earlier than the Evergreen, but it is not so large. It is a very fine quality of sweet corn; it is the very finest for drying we have found yet.

Mr. Sampson: I will say that I have experimented with the genuine Lima bean, but they have been too late for a profitable trade. The little bush Lima is not so profitable. I have not tried the latest bush Lima. I was disgusted with them.

Mr. Beardsley: I would say that out of two or three hundred gardeners we have but two or three successfully raising the Lima bean. I understand they have some kind of a machine that they hull their beans with.

HUBBARD SQUASH.

A DISCUSSION.

A voice: Let us hear from Mr. Chandler on the Hubbard squash.

Mr. E. M. Chandler: While I am a grower of Hubbard squash I do not know that I can give you any pointers. I told the society two years ago how to grow them; but if I can answer any questions you may wish to ask me, I shall be glad to do so.

Mr. Brackett: What age of seed do you get the best results from?

Mr. Chandler: We save our seeds every year, although I think, the older they are, the better they are.

Mr. Frisselle: How do you store the squashes?

Mr. Chandler: They are laid on shelves. We have a house on purpose to store them, in which we have shelves two feet apart. We keep the thermometer about 50 to 54 degrees.

Mr. Taylor: What is the product per acre?

Mr. Chandler: We have raised ten tons per acre, but the average is six tons. The first year we went into the business we got about that many. We have been raising squash on the same ground for six years. It would be a good idea to manure broadcast, but it is a good deal of trouble and expense, so we manure in the hills. We gather our squash as early as they get ripe.

Mr. Jewett (Wisconsin): After cutting do you let them lie in the field any length of time?

Mr. Chandler: We cut them and let them lie in the field three or four days or a week, and pile them up and let them stay out there until they get partly dry, and, if necessary, we build a fire in the house to get out the moisture.

Mr. Wedge: Do you gather them before a frost or after?

Mr. Chandler: Before we get any frost at all.

Col. Stevens: The white frost, if it touches the squash, will cause decay.

Mr. Wedge: You consider first class seed essential?

Mr. Chandler: We select our seeds each year. We aim to pick out the good points in the squash and keep doing so every year, and in that way we get a good squash.

Mr. Wedge: I only asked that question because when I was at Ottawa, Illinois, I struck one carload of squash that came from Minneapolis. I did not think Mr. Chandler would send them as seconds. They got caught in cold weather and froze. The owner hired help to save the seeds, and said he could sell the seeds for more than the squash cost him.

Mr. Taylor: Will Mr. Chandler tell us what the good points of a Hubbard squash are?

Mr. Chandler: The points I consider good in a Hubbard squash are medium size, a squash that will not exceed ten pounds in weight, and at the butt end the Hubbard is streaked.

Mr. A. H. Brackett: Is it true that one squash that fills just the same bulk by measurement as another squash grown in the same patch, will weigh one-fifth more?

Mr. Chandler: Yes, sir; that is true. In selecting seed we select the heaviest squash. We aim to secure seed from the heaviest squash, regardless of size.

Dr. Frisselle: Do you find any difficulty in ripening squash?

Mr. Chandler: We never have, although a year ago last fall squash did not ripen as they ought.

Col. Stevens: Is the surface of a strictly pure Hubbard squash smooth?

Mr. Chandler: It is not.

Mrs. Kennedy: Is it not always hard-shelled?

Mr. Chandler: It is, always.

Mr. Elliot: Do you ever put into winter quarters any squash that are not hard-shelled?

Mr. Chandler: Oh, yes. We do not wait for them all to get hard. A squash commences to harden up at the stem end, and if it is hard at the stem end it will ripen enough after you get it into the house.

Mr. Elliot: Do you grade your squash firsts, seconds and thirds?

Mr. Chandler: We select them right in the field and we put all the choice squash in one house, and put the seconds into another house.

Mr. Taylor: What are squashes worth now?

Mr. Chandler: I received quotations a few days ago, and they were \$40 per ton. I took a carload to Boston last winter and sold them for \$60, and could have sold some for \$70. The freight over the Soo Line is \$8 per ton, or \$96 per car.

Mr. Brackett: What do your squash cost you?

Mr. Chandler: My squash cost me about \$20 to get them sold.

Mr. Taylor: You leave the stems on?

Mr. Chandler: We cut the stems about an inch long, so the men cannot get hold of the stem.

Mr. Elliot: I want to caution some of you people a little about going into the squash business. (Laughter.) It is not every one that can raise squash and get the profit out of them that Mr. Chandler can. Some of you can figure this thing over and see an immense profit in it. I want to caution you a little.

Mr. Brackett: Would you object to having them in a root house?

Mr. Chandler: I do not think it would be desirable; it would contain too much moisture. The house has got to be perfectly dry. Moisture will gather in the best root house.

Mr. Taylor: What soil do you consider best?

Mr. Chandler: I don't know that it makes much difference. The soil I raise mine on I hardly consider fit for anything else. It is a light sandy soil. It is a comparatively dry piece of land; there is a little meadow running through part of it.

Mr. Taylor: How do you protect them from frost in shipping?

Mr. Chandler: We put a stove in the car. We put a false lining in the car and that gives a dead air space all around the car, and then we use a stove in the car such as we use in a potato car, and burn wood. We had a very favorable time going down and hardly struck any zero weather.

Mr. Wedge: There is no difficulty about shipping; that is of small importance. This question of storing and holding until winter and spring is an entirely different matter from getting them to market from the field without any question of storage or after treatment, and so, in considering the high price which Mr. Chandler gets for his squash, we ought not to consider that they are worth that amount in the field. I may not be right, but I am under the impression they sold for \$10 to \$12 this fall.

Mr. Chandler: I consider that squash at \$10 per ton in the fall of the year are as good a crop as can be raised, if there is a ready market in the fall of the year. A year ago last fall we had an active market in Chicago, and I presume there was from thirty-five to fifty carloads shipped out of this market.

Mrs. Kennedy: What fertilizer do you use?

Mr. Chandler: Barnyard manure, well rotted. Put two shovel-fuls in the hill and mix it well. I put out from three to five seeds in a hill and thin them out to two, after the bugs get through with them. I plant them eight feet apart. We never use any treatment to prevent bugs. We have been troubled with gophers more than with bugs. We have started sometimes and put in three or four acres at one time. We must put them in at once, just as soon as we can get them in, for if the gophers find out we are planting squash they follow right up and take them out of the hill. You want to get them in before they know what you are doing. (Laughter.)

Prof. Green: On this subject of gophers—if you take bisulphate of copper, put some on a cloth and stick it in the gopher holes and cover them up, it is effective and will kill them. It is the best remedy I ever used. I have tried poisoning, and it never worked at all.

VEGETABLES.

GEO. JEHU, HASTINGS

I will endeavor to give a sketch of my observations the past season. The early spring was very unfavorable on account of the cold weather, and everything was about three weeks late. Potatoes were a very poor crop on account of the dry weather. Melons were a failure. There were a great many onions put in, but the crop was poor, some planters not getting any. Early cabbage was a fair crop, but out of 200,000 planted about 50,000 were marketed and those very poor; the cause of failure was the dry weather. Some planters lost all by worms; another cause of failure was that we could not plant early enough, the ground being so dry. I had a field of 15,000, in which there were 2,000 of Child's Bismarck, which made very fine,

large heads; all the rest of the varieties were a failure. This is the finest variety of cabbage I ever raised. They are a cross between the Flat Dutch and Drumhead Savoy. Celery was a failure. We grow very fine celery here, but this year not a head was grown, it being too dry.

Tomatoes were very poor; those exposed to the sun on the south side were partly cooked. The root crop such as beets, carrots and parsnips were nearly a failure. The following varieties I have found to be the best after several years experience. Beets, Mitchell's Perfection; carrots, Alneer's Intermediate; parsnips, Hollow Crown. Peas were a fair crop, with Alaska for early, Premium Gem for second and Stratagem for main crop. Sweet corn was very poor, beans and squashes were the same. In seventeen years, '93 was the worst I have experienced, both in vegetables and fruits; in fact, it was only the cultivator that saved what little we had—by frequent stirring of the soil, we kept them alive. In fruits the only good crop I had was plums; they were very fine.

EFFECT OF MULCH ON THE RIPENING OF FRUIT.—It is generally believed that a mulch or heavy cover placed upon the frozen soil around plants will retard flowering and the maturity of fruit, but the results are often unsatisfactory. Careful experiments upon the effect of mulches have been made at the New York Cornell University station by L. H. Bailey (B. 59), which indicate that the early bloom of fruit plants depends very largely upon the appropriation of food stored in the twigs, and it is more or less independent of root action. This is proved both by direct experiment and by study of the physiology of plants. It must follow then that the temperature of the twig or branch must be reduced, if its vegetation is to be much retarded. The top of the plant, as well as the soil, must be mulched, and in practice this is possible only with strawberries and other very low plants, or those which are laid down during the winter. There is danger of injuring plants by heavy mulch which is allowed to remain late in spring. If it is desired to retard flowers or fruit by mulching, the practice should not be violent and the plants should be carefully watched. Many strawberry growers are able, by mulching after hard freezing, to delay the ripening of that fruit from two days to two weeks, but a week's delay is usually about the limit of profitable results.—*Am. Agriculturist*.

Small Fruits.

RASPBERRIES, ETC.

A DISCUSSION.

Mr. M. Pearce: There may be a failure in strawberries, but you take the red raspberry, and for fifteen years I have never had a failure; and if I should live fifteen years longer I should not have a failure. Now, that is saying a good deal. There are great mistakes made in raising raspberries, and there is a great amount of labor thrown away. I believe I can take ten acres of raspberries, cultivate them, lay them down and give them the best winter protection possible, and it will cost no more than growing ten acres of corn. In the place of putting in \$15 to \$20 an acre, I should calculate to do it for \$3.00. There is no crop grown in our state that pays as well as red raspberries if properly handled. The great trouble is that people let them stand until the leaves are all off before they do anything with them. My raspberries are all laid down crosswise of the row the last week in September or the first week in October, and in the spring when I take them up they are just as green as they were in the fall when I put them down. I bend them right down to the ground with my foot and cover them up. It is the easiest thing to cover a mile a day. Just select those canes you wish to cover, bend them right over to the ground, hold them there with your foot and draw earth over them with your hoe. I never remove a cane.

In the spring before taking up the canes, I go along the row with a brush scythe and cut off all the old canes and shoots that are left standing and burn them up; then I raise my canes and string a wire along under them to support them, as they are all leaning the way they were laid down. The new canes that come up during the summer will grow up straight, and in the fall I lay them down in the opposite direction from that in which the canes were laid down the previous season, and in the spring it is easy to cut out the old canes as they all lean in the other direction. And then I string my wire over on the other side; and so I change about from year to year. The ground is kept sufficiently shaded on the side toward which they lean, and on the other side you can cultivate right close up to the row; and if a man has got good ground and gives them good cultivation, no matter how dry it is, he can raise fruit every time. The great trouble is you don't know how to do it. You put off laying them down too long. You let them stand until the leaves are all off and the wood is dry, and then the canes will break before they will bend. I never remove a bit of dirt. It is the easiest thing in the world. I never failed in my life, and I have done it for years and years and years.

Mr. Harris: How far apart do you plant your raspberries.

Mr. Pearce: The Cuthbert I plant seven feet apart and three feet apart in the row. I do not plant in hills, and I will tell you my objection. If planted in hills you can never keep them in the same place, but if planted in rows you can keep changing the position of your plants from year to year. I never let more than four canes grow together, and then every year or two years I let other plants grow between those two plants or hills, and then I can root out the old plants, and in this way have new plants all the time.

Mr. Bunnell: How late do you cultivate?

Mr. Pearce: Right through the picking season; keep it going right along. After I get through cultivating, I plow them; I plow one furrow right from the row and turn another furrow back on the first one and harrow it level. In covering I used to use a spade and one thing and another, but I use nothing but a hoe now.

Prof. Hanson: The common custom recommended by horticultural writers is to lay the raspberries down in the row.

Mr. Pearce: That is just where I said they were wrong. Now, another word in regard to currants. Currants are planted too close. I have a variety of currant—it is an English currant—that spreads fourteen feet. Currants want moist ground, and if you keep them far enough apart you will get a good crop of currants. You will always fail by close planting, because there are so many worms and insects.

Mr. Harris: I do not know whether the audience has got the whole of this, but Mr. Pearce has certainly recommended something that looks very practicable to the raspberry grower. I am one of those scientific farmers, but know nothing about science. I believe the plowing up of a furrow just before you lay them down to make the ground loose is a good idea, but I think it would be better, however, to lay them in the same direction every year, as the raspberry is all the better for a little shade, and if your rows run east and west and you lay the canes to the north the young canes that come up in the spring will give a little shade to the fruit.

Mr. Pearce: You have got to reverse every year, because the growth of the new wood takes almost the same position, and it would be impossible to cut out the old canes in the spring.

Prof. Hansen: The question of currants was referred to a little while ago. The best distance to plant is to plant the rows nine feet apart and the bushes four feet in the row, and every fourth row leave them twelve feet apart to drive in with your manure. In that way you can get at them better to take care of them.

HINTS ON GOOSEBERRY CULTURE.

CHAS. A. GREEN.

Gooseberries can be grown almost as easily as potatoes, as they are marketed when green and about as hard as marbles. They can also be handled and shipped nearly as safely as potatoes, and, as the improved method of harvesting them is by scraping them off the bushes in handfuls with gloved hands, they may be harvested

almost as easily as potatoes. Thus it will be seen that gooseberries can be grown and sold at a very low price, with considerable profit. There is a growing demand for gooseberries. Green gooseberries are ready to harvest at a very early date when there is a scarcity of fresh garden fruits. At this early date, they make excellent pies and sauce, also jams and jellies.

In England, gooseberry jams are used with bread in place of butter, being more economical. In this country there has been no supply of gooseberries in the market up to this date, therefore, gooseberries have not been so largely consumed as they will be when the supply increases.

Gooseberries continue bearing on the same piece of land longer than most fruits; say, from ten to twenty years, depending on the culture given. There is no fruit so certain to bear a crop with so little attention. If rainy weather occurs, gooseberries are not injured as are many fruits. It is not necessary to pick them on any certain day. Plant on good strong corn or wheat soil on a northern slope, if such can be secured. As in all other fruit culture, see that the soil is well subdued of grass and weeds before planting. Mark out the rows in field culture five feet apart one way and three feet apart in the row. Plant in the fall, if possible. If not planted in the fall, plant very early in the spring, as the gooseberry is one of the first to leaf out, and if planted late will not succeed. Where gooseberry plants die after planting, it is solely from being planted too late in the spring, as gooseberries are one of the easiest things in the world to transplant any time before the leaves have pushed out.

As to varieties, Houghton is the old-fashioned, smallish gooseberry, an enormous cropper, and desirable in every respect, except size. Downing is a newer gooseberry, nearly twice as large, and also exceedingly desirable. These two are the old established favorites. Industry is an English gooseberry, which has been grown in this country for the past five years. It is a red gooseberry of large size and fine quality, succeeding famously, except in a few localities where it is subject to mildew.

Lancashire Lad is another English gooseberry of more recent introduction into this country. It is a very large red gooseberry, as good to eat out of hand as an apricot; a heavy bearer, and less liable to mildew than other English varieties. These English gooseberries are of monstrous size and delicious quality, but it has been supposed that they could not be grown in this country on account of liability to mildew. It has been discovered, however, that in very many localities no mildew occurs. Mildew is caused by the hot sunshine; thus, to guard against mildew, plant in the shade of grapevines or of buildings.

An absolute remedy for mildew has been discovered by the Geneva experimental station, which consists of a spray of half an ounce liver of sulphur to each gallon of water, applied each ten days from June to August. Thus, it is possible to grow the large English gooseberries by the acre with no more expense in fighting the mildew, should it occur, than in potato culture in spraying to destroy the potato beetle.—*Green's Fruit Grower*.

Summer Meeting, 1894.

"One of the best summer meetings we ever had" was the general verdict of the one hundred or more members and friends of the Minnesota State Horticultural Society who sat down to the bountifully spread tables on the lawn at Villa Rosa, the beautiful home of Mr. and Mrs. Dorilus Morrison, of Minneapolis, on the afternoon of June 21, 1894. A number of guests honored the occasion, Mayor Eustis of Minneapolis and Prof. Jordan, superintendent of the city schools, Mr. Rogers of the New Jersey Experiment Station, Rev. Dr. Tuttle and Mr. H. M. Kerechjian, an Armenian now in this country for study and observation of our political and social institutions, being of the number, and adding to the pleasure of the meeting by joining in the after-dinner speeches.

The display of fruits and flowers was as large as usual, in some respects surpassing any previous exhibition. The strawberries were a great surprise, in this season of drouth, and have never before been exceeded in quantity, size and number of varieties. Prof. Green, of the St. Anthony Park experiment station exhibited fifty-nine varieties, which, had they been entered for premiums, would have received large notice. The exhibit of out-door roses by the Jewell Nursery Co., was particularly admired.

The day was one of Minnesota's rarest of rare June days, the surroundings were all that nature and art combined could furnish, and, with the many hospitable provisions of the generous hostess, all combined to make the gathering a notable one. After ample justice had been given to the bountiful dinner, while still gathered about the tables, President J. M. Underwood called the attention of the company, in a few well chosen words, to the custom of the society to break away from care and to come together in the free and easy and friendly way which only a basket dinner permits, and to enjoy a few informal after-dinner talks. And so, presiding in his genial way, the president called upon various ones to respond to toasts, some of whom spoke extemporaneously, while others, more timid or less used to such efforts, read from manuscript. This part of the entertainment was very much enjoyed, there being no long, prosy speeches or dry papers, and we would like to present them in full to our readers: but only partial notes were taken. Those in manuscript are given nearly in full. The program was as follows:

VILLA ROSA AND OUR HOSTS.

"How blest is he who crowns in shades like these,
A youth of labor with an age of ease"

Mr. Wm. R. Dobbyn responded, speaking of the advantage to the city in having such a citizen as Mr. Morrison, of the pleasure he had in listening to Mrs. Morrison in her paper before the winter meeting of the society, and of the more intimate glance such an occasion as

the present could give of one's character. "Lamartine has said, 'We know men and women, not so much by what they do professionally, as by what they do outside their regular calling.' A lawyer is more than a lawyer, a minister more than a minister, and a horticulturist more than a horticulturist. And so our hostess is more than a leader in society, more than a literateur. In giving this invitation to the society, she has recognized the influence of horticulture upon the homes of our country, and hence upon the world at large, and shown herself to be a public-spirited woman." Mr. Dobbyn paid a high compliment to Mrs. Morrison for her taste and interest in floriculture as displayed in the laying out of her beautiful grounds. In closing he extended the thanks of the society for the generous hospitality they were then enjoying.

THE MINNESOTA STATE HORTICULTURAL SOCIETY.

Its motto, "*Perseverantiae vincimus*,"—"Through perseverance we conquer."

Mr J. S. Harris, one of the pioneers in the society, was appropriately called upon to respond to this toast, notwithstanding his thought that there had been a serious mistake in calling upon him to answer. Although Mrs. Harris was present, he ventured to say that the Minnesota State Horticultural Society had been his first and longest love, yet, if she had not been the helpmeet she had proved to be, he never could have done as much for the interests of the society as he had tried to do. Starting from small beginnings, he had watched the growth of the society, and was glad to feel assured that it would reach its full manhood and attain its rights. "But this could never have been accomplished, nor could horticulture have made the advance it has in Minnesota, if the motto of the society had not been kept in view. There had been much to contend with besides adverse climatic conditions, not the least of which were the nursery agents from other states who were continually palming off varieties of fruit unsuited to this region. But Minnesota has created many varieties for herself."

The speaker paid a high tribute to Peter Gideon in his self-sacrificing efforts in conducting the experiments that finally led to the origination of the Wealthy apple, telling how this lover of fruit went without needed clothes in order to buy the seed with which to experiment. The society have heard a good many of Mr. Harris' stories of the privations and discouragements of the early days in Minnesota, but this time he had a new one, telling how his wife had gone barefooted all one summer in order that the money might go for trees. Mr. Harris feels that the victory is already won, and predicts that from the seedlings now coming into bearing will be found varieties that will command a market throughout the country, and that we will even be sending them to Russia.

THE MINNESOTA HORTICULTURIST,

The pioneer horticultural journal of the Northwest, and the natural development and extension of the work of this society.

Mr. Clarence Wedge, in response, read the following paper, though he apologized for using his manuscript, excusing himself on the ground that he was following the example of that prince of after-din-

ner speakers, President Northrup, who, he remembered, used his notes when he spoke before the society at the banquet given by Mrs. Morrison in the winter of 1893:

Perhaps, the best response that I could make to the sentiment given me would be found in reading a few of the many words of satisfaction that have come to me in my correspondence with a small share of the members of our society, with, as yet, not a word of regret or complaint.

Has it ever occurred to you that we are living in the golden age of our art in the Northwest? The grandest years of a nation, as of an art, do not come after growth and perfection has been attained, but are always found in the period of conquest, discovery and advancement; when David is mastering the Philistines, when for Rome, Scipio is struggling with Carthage, and when for Spain, Columbus discovers America. The golden days are those of earnest beginnings, of large obstacles, of new expedients, of great victories; when the nobler qualities grow and expand, and selfishness slinks away.

Horticulture has as much in store for us of Minnesota as she ever had for our fathers in New York, but it will never come to us by copying. We shall have to work out our own methods and varieties. We have ransacked the world, and now, with the material in hand and the experience of the past, we shall have to create—yes, the dignity of *creation* may be put upon it—our own horticulture. No mean task this of providing for the growing wants of our growing population, of originating those fruits and flowers that shall be at home in our climate, and of spreading the useful knowledge that we have gained among our fellows. In carrying out this great work that has fallen upon us, what tools can we use that will best help us to the end in view?

Those who have met with us and enjoyed our annual meetings know with what fresh vigor we go back to our work, wishing only that their good influences might be more frequently enjoyed, that the opportunity to traffic in ideas with our brothers in this work might come more often.

And now, as the wish is father to the thought, so the thought has been realized in the deed, and this year in "*The Minnesota Horticulturist*" we meet together *once a month*, almost look into the cordial faces of our friends, learn of their trials and triumphs, of their work and ways, and return to our toil with the cheerful feeling that we are not alone, but one of a brotherhood.

Our society occupies today the place of honor in two respects. We are at the very front in wresting from Nature her hardest treasures; and we are the first to send out our knowledge in the modern way. These two facts ought to work greatly to our advantage and make our magazine and our products of good reputation.

"The Minnesota Horticulturist," thou child of sturdy parentage, born in due time under the auspicious pole star, with the mark of fate upon thee, and a legacy of honor behind thee—we hail thy coming! May thy infancy be strong in growth, thy years in usefulness, and thine age like the oak that shades our doorways! Under thy counsel and leadership may the banners of the Minnesota State

Horticultural Society never be lowered, until an orchard and shelter are about every farmhouse, a fruit garden with every villager, and the rose and the window garden brighten every home in all our broad Northwest.

AGRICULTURAL EDUCATION.

Prof. S. B. Green, of the State Agricultural School, in presenting this subject spoke briefly of the importance and advisability of combining the practical with the scholastic education. His experience showed him that there was no less interest or less acquisition from books by teaching the boys in the same connection something of the chemistry of the soils and plants and of methods in their preparation and care. He would have the high schools in the rural districts agricultural schools. While industrial education is not going to do everything, it will help to solve many of the questions now crowding upon us. There was a time when the farmers were said to be hostile to education, and Prof. Green would not much blame them for thinking that the old scholastic systems only unfitted their boys for actual life. It only showed their manly independence and strength of character as a class. And it was no wonder that they were not very enthusiastic about agricultural education, when, only a few years ago, one man was expected to teach all that was necessary.

Prof. Green referred to the influence of the school at St. Anthony Park, thinking the little leaven going out from the 206 students in their agricultural department last year would make a great difference in the agriculture of the state. This year an experiment had been tried by opening a summer school for girls. It had surpassed their expectations. They had thought if they should have thirty applications they would feel much encouraged, but there had been fifty-eight in attendance. President Northrop says the girls' school has come to stay, and next summer the term is to be two months instead of one, as this year. Eventually, Prof. Green thinks the winter school will also be open to girls.

THE ROSE UNDER GLASS.

"Who loves a garden loves a greenhouse too."

Mr. R. J. Mendenhall of Minneapolis spoke to this sentiment. After referring to the universality of the rose, it being found in every part of the globe except Australia and a few islands of the Pacific, he spoke of the many things with which the cultivator of the rose under glass has to contend; of the insects that prey upon all parts of the plant, of the saw fly that eats the leaves, the rose chafer and others.

"The trouble is, we don't know just how to treat the rose. We must study soils, heat and moisture, trying to make out-door conditions. Water and planting have to be considered, and ways of propagating." He spoke of the ways by which one variety of rose is merged into another. Digressing from his subject somewhat, the speaker referred to the wide use made of the rose, of its place in classic literature and in the materia medica.

"There is no plant or flower in the whole vegetable kingdom that commands or that receives so much attention from florists as the rose. Immortalized from the most ancient times, its fame has been sung by poets, philosophers and divines. As the emblem of youth, it was dedicated to Aurora, the morning. As the sentiment of love and beauty, it was relegated to the care of Venus; as of danger and fugacity, Cupid held it under command. According to the classical writers, the rose was presented by Cupid to Harpocrates, the god of Silence, hence 'sub rosa,' or under the rose—'we will speak our love in silence.' The learned Dr. Lindley talked of the power of the rose in the *materia medica* as one of the greatest in pharmacopœia. In all nations, everywhere, it is recognized as the queen of flowers. Other floral stars have arisen, flourished meteor-like for a time, but all, all have paled before the conquering Queen Rosa."

THE ROSE IN SCRIPTURE.

"I am the Rose of Sharon and the Lily of the Valley."

In response Mrs. A. W. Latham, read the following:

If I had been asked to respond to the sentiment, "The Flowers of the Bible," I should still have had a dearth of material from which to gather thoughts for your entertainment.

We all know that the Bible has a distinct object in view in all its teachings and illustrations, and it is remarkably silent upon matters which have little bearing upon its main object.

We are told that Aaron's rod, which brought forth buds and blossomed, yielded almonds, but of the burning bush, which to Moses was a symbol of God's glory and power, we are left in ignorance.

The Savior spoke to us of the "Lily of the Valley," but only that it might bring to us a lesson of freedom from anxiety and care.

The rose is mentioned but twice in the Bible, the first being but an indirect allusion to it: "The wilderness and the solitary place shall be glad for them, and the desert shall rejoice and blossom as the rose," the other is the text used as the sentiment for this toast, "The Rose of Sharon," which we are told was not a rose at all, but the narcissus, that star-like, beautiful flower of early spring.

One of our poets has said, "What's in a name? The rose by any other name would smell as sweet." And so, whether the rose of Sharon brings to us, through the star-like narcissus, the thought of the Bright and Morning Star, that Star which has guided many weary feet into the pathway of life, or whether it brings to us the sweet perfume of that life of gentleness and peace, of purity and love, it matters not, for with the star to point the way and the purity of that life as our guide, the desert of our lives shall blossom as the rose. "It shall blossom abundantly, and rejoice, even with joy and singing. The glory of Lebanon shall be given unto it, the excellency of Carmel and Sharon. They shall see the glory of the Lord and the excellency of our God."

THE ROSE IN LITERATURE.

"The lily is all in white like a saint,
And so is no mate for me;
But I will plight with the dainty rose,
For fairest of all is she."

In response to this toast Miss Emma V. White of Minneapolis, read the following paper:

It is but natural that a flower which all so love and admire should have been early singled out by the poet to be the theme of his immortal song, or by the painter to be portrayed upon the not much less lasting canvas. And so we find all literature replete with references to this fair flower, the rose, for which our hostess has so appropriately named her beautiful home and which we see in such profusion around us on this perfect June day. Surely Lowell must have had in mind one of the same days, which only Minnesota can give—like today—when he said:

"What is so rare as a day in June!
Then, if ever, come perfect days,
Then heaven tries the earth if it be in tune,
And over it softly her warm ear lays."

And so we are gathered here in

"This month of June,
The month of leaves and roses,
When pleasant sights salute the eyes,
And pleasant smells the noses."

In recalling what has been written or said of the rose, we find it is not man's creation—the gorgeous Jacqueminot, or the less gaudy Marchal Neil, or the blushing La Belle France, or yet the newest origination of the florist—the Wyman Elliot—'tis not these of which the poet sings, or that the artist delights to portray; but it is, rather, the rose of God's creation—the unassuming wild rose, that lifts its modest head in solitude or smiles out upon us from the dusty highway. This it is that has been the inspiration of many a beautiful poem.

And yet, no poet has selected the rose as the theme of his song, immortalizing it in such tender loving verses as did Robert Burns the daisy in his beautiful poem, "To a Mountain Daisy." The more quiet appearing flowers, the violet, the lily, the daffodil and the daisy seem to be the poets' favorite themes; yet they love the rose, and more often refer to it, either to its own beauty or making figurative use of it, than to any other flower. Particularly is it used as a symbol of maidenhood, or by lovers in their courtship. A few quotations may be not uninteresting.

Burns says:

"Oh, my love's like a red, red rose,
That's newly sprung in June."

Waller sends a rose to his lady, saying:

"Go, lovely rose!
Tell her that wastes her time and me,
That now she knows,
When I resemble her to thee,
How sweet and fair she seems to be!"

Tennyson speaks of

"The queen rose in the rosebud garden of girls."

And Byron says of the young girl:

"A lovely being scarcely formed or molded,
A rose, with all its sweetest leaves yet folded."

Perhaps the best known poem is Moore's "The Last Rose of Summer," but this is hardly about the rose, either. The theme only affords the singer an opportunity to indulge in a melancholy fancy regarding the transitoriness of human friendships. Quaint Robert Herrick, too, makes the same use of the rose:

"Gather ye rosebuds while ye may,
Old Time is still a flying,
And this same rose that smiles today
Tomorrow will be dying."

But Shakespeare would not leave his rose to die, or be "left blooming alone." He says that

"Earthlier, happier is the rose distilled
Than that which withering on the virgin thorn
Grows, lives and dies in single blessedness."

Then, there is that tender sentiment that has done duty in so many youthful albums. Go back in fancy, friends now gathered about this board, to the old school house nestling beneath the hill or protected by the spreading arms of some old New England elm; go back to your school days when you had singled out some blushing, bright-eyed maid for your admiration, either boldly expressed or bashfully hidden in secret, when you scribbled her name in all possible places and wrote very mortal verse in her honor; and did you not, when February 14th came around, become so bold as to send her these touching lines?

"The rose is red, the violet blue.
The pink is pretty and so are you."

Perhaps, this maid, a matron grown, sits by you now, or watches in your home. Perchance, she faded as the rose, or, perchance, your paths divided. Yet it needs only the repetition of these sentimental lines to make the picture for a moment vivid. May it be only a pleasant one! If not, remember "There is no rose without a thorn."

There are many beautiful legends about this flower. Did you ever hear the one as to the origin of the red and white roses? In Bethlehem a beautiful maiden was accused of some crime and condemned to be burned at the stake. The stake was driven, the maid was fastened to it, the faggots were piled about her and lighted. Feeling that she was wrongfully accused, she prayed to God that, if she was innocent, he would come to her rescue. Immediately the flames were extinguished; from the faggots that were already burned sprang beautiful red roses, and from the unburned faggots sprang white roses, and before that day, according to the story, there were no roses in that land.

Bayard Taylor tells of an oriental banquet at which the host, taking a basket of roses, said that "he who exalts them most in song, he only shall the roses wear." Various guests contested for the prize when at last Hassan Ben Khaled arose.

"The rose," he sang, "is either red or pale,
 Like maidens when the flame of passion burns,
 And love or jealousy controls, by turns.
 Its buds are lips preparing for a kiss;
 Its open flowers are like the blush of bliss
 On lovers' cheeks; the thorns its armor are;
 And in its center shines a golden star,
 As on a favorite's cheek a sequin glows:
 And thus the garden's favorite is the rose."

This pleased the host and from his open basket he shook the roses on Hassan's head.

Then there is a beautiful story of the origin of the moss rose. The angel of the flowers one day lay sleeping beneath a rose tree and on waking, feeling grateful for its protecting shade, he whispered to the rose:

"O, fondest object of my care,
 Still fairest found, where all are fair;
 For the sweet shade thou giv'st me
 Ask what thou wilt; tis granted thee.
 Then, said the rose, with deepened glow,
 On me another grace bestow.

The spirit paused in silent, thought,—
 What grace was there that flower had not?
 'Twas but a moment,—o'er the rose
 A veil of moss the angel throws,
 And, robed in nature's simplest weed,
 Could there a flower that rose exceed?"

In conclusion, shall we say with Shakespeare, "What's in a name, that we call a rose by any other would smell as sweet?" Happily, man does not live by his olfactory nerves alone, and, though the smell might remain, yet we can hardly divorce our delight in this beautiful flower from its name; and we protest against the florists uniting with it uneuphonious names. Who would be attracted, for instance, by the name "Cabbage" rose, or be impelled to send for it on seeing its name in a catalogue? We cannot deny, with Browning, that "any nose may ravage with impunity a rose," but we do assert that there is much in a name and protest against the use of unpoetical, unappropriate names with this, our favorite flower.

With Thomas Hood we say,

The lily is all in white like a saint,
 And so is no mate for me;
 And the daisy's cheek is tipped with a blush,
 She is of such low degree;
 Jasmine is sweet, and has many loves,
 And the broom's betrothed to the bee;—
 But I will plight with the dainty rose,
 For fairest of all is she."

A RECITATION.—"WHAT IS SO RARE AS A DAY IN JUNE?"

By Miss Dixie Smith, Minneapolis.

It was most appropriate that the beautiful prelude to Lowell's "Vision of Sir Launfal" should be given on this occasion, and the company very much enjoyed Miss Smith's rendering, as with clear and pleasant voice she brought out its store of rich thought and figure.

THE FRUITS AND FLOWERS OF NEW MEXICO.

By Mrs Dorilus Morrison.

In response to the theme of the "Fruits and Flowers of New Mexico," let me say that our visit there was in the winter season, and, therefore, the most and the best I could do was to read and talk flowers with those enthusiastic people.

The main difficulty with successful growing of some kinds of plants and fruits there is the limited supply of water, but they are a progressive people, away off there in New Mexico, and they are busy in developing all sorts of schemes for irrigation; and when they perfect this system, they will tell you—some of them will—that they will rival California.

The territory is especially adapted to the culture of the grape, the yield of fruit being abundant and the wine produced of excellent quality everywhere. The cactus, differing varieties of them, are to be seen, sometimes almost like a tree upon the plains, and then, again, high up among the rocks; and in spite of its different aspect, armed thickly, as it is, with thick needle-pointed spines, it is said to be a splendid object late in June, when every branch bears at its apex a large cluster of brilliant blossoms.

Tradition is largely associated with this flower, and upon the coat of arms of New Mexico there is always to be seen the cactus with a serpent entwined about it, which is an emblem of the discovery of the territory of the early Spaniards, with a superstitious but very interesting story connected with it, that is much too long to relate at this time.

One hears the most wonderful stories of the plums, the apricots, the cherries, the blackberries, raspberries and many other fruits of New Mexico, all of which I was prepared to believe by a circumstance which I will relate to you:—

Our visit there happened to be to Gov. and Mrs. Prince, who resided in Santa Fe. Gov. Prince was the vice-president, and Mrs. Prince the first lady member, of the horticultural society of New Mexico. They became interested in my paper upon the "Culture of the Rose in Private Grounds" given before this society, and urged me to repeat it to a company of friends invited one Sunday evening to their house for this purpose.

Out of this it came to be noised about in the small town that I was especially interested in floriculture, and before we left Santa Fe some members of the board of trade kindly sent me a wonderful picture of the fruits and flowers of New Mexico. I have always meant that the picture should finally find its way to the walls of the Minnesota Horticultural rooms, as an inspiration for us to emulate the magnificent products of that far off territory of our beloved land. And is there any more propitious moment, my friends, than this very present one for the execution of that good intention? I think not, and so I have had the picture attractively framed, and may I now beg that the society will excuse me from talking of a subject which is so much more vividly portrayed in the picture before us, and that you will accept, with my hearty good wishes, this New Mexican

souvenir of the fruits and the flowers which come so very near our hearts?

Mrs. Morrison, at the close of her paper, presented to the society a large picture, handsomely framed, illustrating her subject, which had been sent to her by the Board of Trade of Santa Fe. The thanks of the society were expressed by rising, and also by a few words from Pres. Underwood. He emphasized the thought that had been impressed upon him from the beginning of his more intimate relation to the society of the necessity of having a society home, and of his hope in their some time accomplishing this end. And now, with such a beautiful picture to adorn its walls, he thought all the more they needed a place to put it. In the meantime, it should grace the walls of Secretary Latham's office.

FRUITS AND FLOWERS OF TURKEY.

In a very bright and witty speech, Mr. H. M. Kerechjian, the guest from Armenia, responded. His complimentary references to the hostess of the occasion and high tributes to the civilization of America, showed himself not behind, at least, in turning language most delicately and in perceiving the salient points of American character and institutions. With it all, too, he gave much that was both interesting and instructive regarding the horticulture of his country, although he said that it could hardly be called by that name, for in that country they have such a profusion of nature that they don't meddle with it. He was impressed with the fact that a republic has unbounded opportunity, and wherever he went every place seemed suitable for a center. Just now Minneapolis seemed the center of the country, and Villa Rosa the center of the city. His people were somewhat noted for their lack of progress and desire to take a rest. He thought a rest a good thing if it could be taken always in Villa Rosa.

In Turkey, where nature is so prolific, there is little of art, little of man's effort to further the growth of her products. Ship loads of oranges come in from Joppa and yet there is no association to foster the industry or the export of the fruit. Apples, such as we have never seen or dreamed of in this country, are abundant and so fragrant that a basketful placed in a room fairly makes it dangerous for a man to sleep there. Then there are whole forests of fig trees, requiring a warm, moist climate, and figs are exported in great abundance. Near Constantinople the strawberry is raised. They are of a delicate pink color and are brought into the city in baskets weighing twelve pounds. Grapes are of a light amber color, and the skin is so thin that they break simply by coming in contact with the mouth.

Turkey may be considered the land of the rose, where it is cultivated for its beauty, and for the essence it yields. The jasmine gardens, too, are an interesting sight. This is cultivated for its stem, which is used for pipe stems. It is trained on a scaffolding, sometimes seventy feet high. Then there are the same flowers as are grown in America, the pink, sweet pea, pansy, etc. But the cultivation of flowers for their commercial value is hardly an industry as

yet, although in Constantinople some Germans and French have started greenhouses. The Orient is following America very closely, although there is, as yet, no society for the development of horticulture, nor is there any great development of the art itself. Nature is left to do the work alone.

The fruits are thought of as coming direct from God, and in eating them they are drinking in God's blessings. In America the people can in peace and prosperity meet to consider how they may cultivate and improve these blessings; but in Armenia the people are crushed by the tyranny of an unrighteous government, by famine and want. Mr. Kerechjian spoke, when he came to this country, of being full of the political and social questions suggested by the burdens his countrymen were bearing, and being, consequently, more naturally drawn to these questions in our country. And he had been sometimes surprised at the questions asked of him about ladies' trousseaus, courtship in his country, etc., which he didn't realize were so important, or even such as he had been asked to speak of here today,—the fruits and flowers of his country. Yet he believed there was a deeper meaning in the work of horticulture and that there are many lessons from the flowers.

THE CULTURE OF THE ROSE.

This was a carefully prepared and instructive paper on the culture of perpetual roses, by Mrs. Isaac Atwater of Minneapolis, who wrote from personal experience. In the absence of Mrs. Atwater the paper was read by Mrs. Morrison. It will appear in full in a later number of "The Horticulturist." (See index.)

ART VERSUS NATURE.

Rev. Dr. Tuttle, of Minneapolis, was invited to respond to this subject. He spoke of the various references to Lowell's line, "What is so rare as a day in June?" saying this is more rare—a day in June, in such a company, in such a place, at such a time. Some authorities say that nature and art are one; it is said that man and his wife are one, and that one the husband. But the speaker could more easily believe that nature and art are one, and that one, nature. Nature is that which does everything without our forethought; art is that which we do, invent or construct. Which is greater or more pleasing? Dr. Tuttle said that when he saw such pieces of architecture as St. Peters at Rome, the Milan cathedral, or the suspension bridges at Niagara and Brooklyn, he wondered if there was anything in nature to equal them; but when he saw Yosemite, or the great National Park, he said, "What can equal that?" During the recent drought our lawns have been kept green and the trees alive by the water the city affords, but the shower that came up the other night sprinkled them far better in half an hour than we could. We enjoy fireworks, yet last night there was a far more wonderful display of heavenly pyrotechnics. We could not do without nature; yet we do not wish to do without art. He compared this spot with what it was when Mr. Morrison first came here. Villa Rosa is an example of what art can do. Yet the laws of nature must be complied with,

and after all, nature does most. Solomon was gorgeously arrayed, yet there never was a garment so fine as the petals of the rose or the lily. Man can build a railway, yet he cannot construct the tiny seed of the flower that grows by its side. In closing, Dr. Tuttle deprecated the fact that people did not know more about the common things about them—the names of the flowers and birds, etc., emphasizing the thought that these should be taught in our public schools.

REMARKS BY MAYOR EUSTIS.

The president next called upon Mayor Wm. H. Eustis, of Minneapolis, who spoke in a most happy manner. He referred to the rare picture before him,—in the background, Mr. Morrison, the first mayor of the city, a man now eighty years old, and by his side Supt. Jordan, of the public schools, typical of the man today bearing the heat and burden of citizenship; above them the flag, only thirty-seven years older than the citizen; in the foreground a body of enthusiastic men and women, in their places performing the parts of good citizenship; the sound of falling water, the beautiful trees—all making a sweet scene of peace.

Referring to Mr. Kerechjian's remarks about the manner of courtship in his country, the mayor said he would like to love in Armenia, but he preferred to work in Minneapolis. "It is better to be where nature does not do it all, but compels men to do something. The horticulturist is compelling nature in flowers and fruits to do much and to do its best."

Mr. Eustis spoke of the rose in history, of the long contest between the rival families of England known as the War of the Roses, enlivening by entertaining anecdote and story. He found one day a pink in Seville, but he learned that the pink was a stranger in Seville. Charles V, the great emperor, had brought it from Africa. Charles is dead but the pink remains. The pink is the real conqueror of Spain. In closing, he spoke of his pleasure in meeting with the society, especially on such a day and in such a perfect company and place, Villa Rosa—a rose without a thorn.

President Underwood also called upon Mr. Rogers, the guest from New Jersey. He spoke briefly, referring first to the rose, which had received so much attention. In Minnesota, he said, he had met two choice roses: the one a new rose, the Wyman Elliot, raised upon the prairie soil, climbing heavenward; another—and he would ask if the human mind was not as choice a rose as ever was created?—at St. Anthony Park, where he found that mind that has transformed such places as this into a Villa Rosa. He urged the people to plant the seeds of horticultural and agricultural education, and, as a member of the New Jersey Horticultural Society, he extended the right hand of fellowship to the Minnesota society.

This closed the literary program and brought to a formal termination a meeting that was most heartily enjoyed by all. The guests lingered long, strolling about the beautiful grounds and it was late in the afternoon when the members at length said "good bye," till the winter meeting.

AWARD OF PREMIUMS.

ROSES.

JEWELL NURSERY CO.—Fisher Holmes, first prem.; Mabel Morrison, first prem.; La France, second prem. 50c; Gen'l Jac., second prem. 50c; John Hopper, first prem.; Magna Charta, first prem. \$1.00; Crested Moss, first prem. \$1.00; Ulrich Bruner, first prem. \$1.00; Madame Plantier, first prem.; Madame Gabriel Luizet, first prem. \$1.00; Victor Verdier, first prem.; Baroness Rothschild, first prem.; Alfred Colomb, first prem. \$1.00; Prince Camille de Rohan, first prem.; Czar of Russia, first prem.; Paul Neyron, first prem. \$1.00.

F. G. GOULD.—Spray of roses, first prem. \$3.00; Gen'l, Jac., first prem. \$1.00; Perle, second prem. 50c; Bride, second prem. 50c.

E. NAGEL & CO.—Perle, first prem. \$1.00; Sunset, first prem. \$1.00; Bride, first prem. \$1.00; Mermet, first prem. \$1.00; Bennett, first prem., \$1.00; Wooten, first prem. \$1.00; La France, first prem. \$1.00; Duchess of Albany, first prem. \$1.00; spray of roses, second prem. \$2.00; design of roses, first prem. \$5.00.

MRS. DORILUS MORRISON, *Committee*.

STRAWBERRIES.

WM. DANFORTH.—Bubach, first prem., \$1.00; Monarch, first prem., 1.00; Warfield, first prem., 1.00.

A. H. BRACKETT.—Bubach, second prem., .50; Crescent, first prem., 1.00; Louise, first prem., 1.00; Michel's Early, first prem., 1.00; Princess, second prem., .50; Warfield, first prem., 1.00; Capt. Jack, first prem., 1.00; Glendale, first prem., 1.00; Lovett, first prem., 1.00; Parker Earle, second prem., .50; Haverland, second prem., .50.

ANNA B. UNDERWOOD.—Workman, first prem., \$1.00; Haverland, first prem., 1.00; Capt. Jack, first prem., 1.00; Warfield, second prem., .50; Princess, first prem., 1.00; Bederwood, second prem., .50; Van Deman, second prem., .50; Mt. Vernon, first prem., 1.00.

WM. LYONS.—Parker Earle, first prem., \$1.00; Stayman No. 1, first prem., 1.00; Bederwood, first prem., 1.00; Crescent, second prem., .50; Sandoval, first prem., 1.00; Barton's Eclipse, first prem., 1.00; Van Deman, first prem., 1.00; Saunders, first prem., 1.00; Enhance, first prem., 1.00.

MRS. E. B. CROOKER.—Gandy, first prem., \$1.00.

WYMAN ELLIOT,
J. P. ANDREWS,
R. S. MACKINTOSH. } *Committee*.

VEGETABLES.

WM. LYONS.—Asparagus, first prem., \$1.00; pieplant, first prem., 1.00; potatoes, second prem., .50; peas, first prem., 1.00; lettuce, Early Prize Head, second prem., .50.

J. R. CUMMINS.—Lettuce, Boston Curled, first prem., \$1.00.

J. T. GRIMES, }
E. R. POND. } *Committee.*

MINNESOTA FRUIT AWARDS AT THE WORLD'S FAIR.

The superintendent of the Minnesota World's Fair Exhibit has received from John Boyd Thatcher, chairman executive committee on awards, an official copy of the awards given to the horticultural department of the Minnesota exhibit, and which will in due time be inscribed in the diplomas and forwarded to the persons below named. These awards make a splendid showing for Minnesota's fruit possibilities, and speak well for the exhibit made.

EXHIBITION REFRIGERATOR.

A very ingenious invention admirably adapted for the purpose of preserving fresh fruits and vegetables. It is well suited to the purposes for which it is intended, and the practical test of the season shows its adaptability to other kindred uses.

SMALL FRUITS.

The exhibit consists of small fruits, as strawberries, raspberries, blackberries, currants, blueberries, gooseberries and other kinds. The display was maintained throughout a long season, and covers a wide range of varieties.

The fruit is exceptionally fine in quality, being of excellent flavor, and in good condition.

The display is contributed by the following growers of the state:

J. W. Finch, Eden Prairie; J. M. Underwood, Lake City; J. S. Harris, La Crescent; G. H. Prescott, Albert Lea; C. W. Sampson, Eureka; M. W. Cook, Rochester; Thomas Redpath, Long Lake.

COLLECTION OF GRAPES.

A fine display, consisting of fifty-three varieties of the best known sorts. Both the clusters and the berries are large and well formed. The flavor is exquisite, and the condition of the fruit indicates that great care was exercised in the handling and arrangement.

The exhibit was contributed by the following growers of the state: S. B. Green, St. Anthony Park; P. H. Perry, Excelsior; C. W. Sampson, Excelsior; Mrs. S. Erwin, Excelsior; A. W. Latham, Excelsior; Mrs. I. Barton, Excelsior; H. L. Crane, Excelsior; D. Buck, Mankato; E. J. Cutts, Howard Lake.

Secretary's Corner.

This issue presents the anomaly of reports of two summer meetings, that of last year and of the present one. There has been no convenient opportunity, heretofore, since beginning the publication of the monthly to publish last summer's report, and as it is the purpose of the present publication to give society news promptly, it seems best to put the two together in this issue.

With this year the old matter will have been worked off and thereafter the monthly will contain the news and doing's of to-day, and be made the mirror of the present.

The reading of these two reports will show you the interest and enjoyableness of our summer meetings, which no member within reach should miss.

THE REPORT ON MINNESOTA FRUIT AWARDS at the World's Fair by the committee on awards appears in this number. It has taken nearly as long for the officials to make these returns as for the Chicago people to build up the great fair.

Due credit is given therein to the superior quality and appearance of Minnesota fruit, and the names of the principal contributors mentioned; but there is a long list of others who contributed willingly of what they had and assisted materially in the final result. The full list will be published in the September number of this magazine, which number will be devoted to the report of the superintendent of the Minnesota fruit exhibit.

LIBRARY ADDITIONS.—The following books have been added to our library since April 1st:

- | No. | |
|------|---|
| 446. | Report Missouri State Horticultural Society, 1893. |
| 447. | Report Nebraska State Horticultural Society, 1893. |
| 448. | Report Western N. Y. Horticultural Society, 1894. |
| 449. | Report Kansas State Horticultural Society, 1891-3. |
| 450. | Report Nebraska State Horticultural Society, 1894. |
| 451. | Report Iowa State Horticultural Society, 1893. |
| 452. | Illinois World's Fair Fruit Exhibit. |
| 453. | Northwestern Pomology, by C. N. Gurney, Concord, Neb. |
| 454. | Report Ontario Fruit Growers' Association, 1893. |
| 455. | Ontario Experiment Station Reports for 1890. |
| 456. | Ontario " " " " 1893. |

Besides the above, there are the regular bulletins from the various Experiment Stations and many horticultural magazines and papers that come into this office in the way of exchange for our magazine.

POMACEOUS AND STONE FRUITS.

Apples (Crop of 1892)—A fine display, consisting of twenty-eight varieties, tastefully exhibited in a refrigerator case. The fruit is highly colored, of good flavor, and quite free from insect and other blemishes. The nomenclature is perfect. Several new varieties of excellent quality are shown, which apparently are very promising.

Apples (Crop of 1893)—Large collection, consisting of fifty-nine varieties, all of which are of the best kinds grown in the state. Many new and valuable kinds are shown. The fruit is uniform in size, beautiful in color, and free from insect and other blemishes.

(Signed)

E. F. BABCOCK.

Stone Fruits—A fine display, consisting mainly of plums and peaches. The special feature of the exhibit are the new seedling varieties of plums contributed by D. Cook, of Windom, and O. M. Lord, of Minnesota City. All the varieties are of good size, color and flavor, and in excellent condition.

(Signed) GEORGE I. MOTZ.

Your Corner.

I am pleased with the issue of the Horticulturist monthly. I thought that, perhaps, you might like a few lines from this part of Winona county. Our trees were very full of blossoms about the middle of May, and everything seemed to promise a bountiful crop of apples. Then the cold wave came and killed about three-quarters of the apple blossoms; but still think that we will have from one-half to one-third of a crop of Duchess. The Wealthy are hurt the worst, and there are few apples left on the trees. Transcendents are about like the Duchess, at least, one-half have been killed by the frost. If you can, please let us know in next number how the fruit crop of this state is, also, the adjoining states of Iowa and Wisconsin.

Yours very truly,

C. L. BLAIR.

St. Charles, Minn. June 27, 1894.

Reports received from different parts of the state indicate a condition of things in the orchards very similar to that outlined in the aboveletter. The fruit spurs were very generally frozen, blossom and leaf and wood, by the extraordinarily cold weather. Some at first ascribed this injury to blight, but the general belief that the frost is responsible seems to be well founded.

I have no definite information as to the apple crop in adjoining states.—SECY.

THE MINNESOTA HORTICULTURIST.

VOL. 22

AUGUST, 1894.

NO. 7

Experiment Stations.

MIDSUMMER REPORTS, 1894.

(These reports cover the period from January, 1894, to about the middle of July, just before going to press with the August No.—SEC'Y.)

CENTRAL EXPERIMENT STATION.

ST. ANTHONY PARK.]

SAMUEL B. GREEN, PROFESSOR OF HORTICULTURE, SUPT.

These midsummer reports from the Experiment Stations are not expected to be complete, but simply for the purpose of getting the news of the Stations to the members of our society while it is news, and timely, so I have just touched on some matters of special interest at this season.

EXPERIMENT STATIONS.

The work of the Experiment Stations is increasing in popularity very rapidly. This spring the wishes of the superintendents of the Horticultural Experiment Stations have been complied with as nearly as was practicable, and considerable material has been sent out for trial. The Central Experiment Station has this year made a new departure and established a sub-station near Marshall, in Lyons county, where will be carried on agricultural as well as horticultural lines of work. It gives us what, probably, will be a permanent station in one of the most severe sections of the state. This is a decided move in the right direction and will, undoubtedly, be of great ultimate benefit, especially as a place for experiments in tree growing.

Perhaps the trees, shrubs and other plants at the Central Experiment Station never appeared in better shape in the spring of the year than after last winter. Almost everything on the grounds was in vigorous growing condition, and the warm days of March and April forced it into growth very rapidly. All our fruit trees and plants flowered well and many kinds profusely.

APPLES.

The apples have been injured by a frost which came when they were in blossom, and also by a blight which attacked the fruit spurs principally, but several varieties have set sufficient fruit. The apple trees are in good condition and but little blight shows itself on those kinds which we generally consider resistant varieties.

PLUMS.

The plum trees are heavily loaded with fruit and the crop promises to be an enormous one, nearly every tree of bearing size having a full crop. In sections some trouble has come from plum pockets (*Taphrina pruni*), but at the Central Station the loss from this cause is trifling. The trees are healthy and very free from leaf lice, which have been abundant in several previous years.

GRAPES.

The grape vines lost many buds last winter, but with all this they were never more productive than this season nor the bunches larger and more promising. A part of one vineyard has been changed from a short cane, low renewal system to a very high trellis and is trained on what is called the Munson drooping system. I think very highly of this system and believe that vines managed under it will produce more fruit and be easier to care for and less liable to injury from early autumn frosts than under any of the old systems adapted to this section.

STRAWBERRIES.

The strawberry crop has been a very good one at this station many varieties never doing better with us. Warfield, Haverland and Crescent seem still to stand at the head of pistillate and productive varieties, and in the order named, while Bederwood is perhaps the best of the perfect flowering kinds, with Enhance a close second to it. The old strawberry beds, when properly renewed, have fruited much more abundantly than new beds, and this corroborates our previous experience for ten years. The old system of once cropping a strawberry bed and then plowing it up is wasteful and not productive of the best results. A detailed report on strawberries will be found further on in this report. The strawberry beds were sprayed this spring with Bordeaux mixture, a part being left without spraying as a basis of comparison, but no apparent benefit seemed to come from the application of this fungicide this year. I believe, however, that it is a good plan to do this work and that usually it will be beneficial.

RASPBERRIES.

The raspberry crop was never more promising than in the spring, but it will be somewhat shortened by the dry weather. Black raspberries are doing especially well. The Older seems to be a most excellent variety of them for general planting; the Kansas is a fine berry for a second early kind. The red raspberries will be a fair crop on several kinds, but a number of varieties have been seriously injured by anthracnose and the "curl leaf," which is a term used for

want of a better name and is quite descriptive of the disease. Experiments are being made in the hopes of controlling these diseases by the use of fungicides. The Hansel, Marlboro and Kenyon's Seedling are doing well. The latter we are fruiting for the first time, and it appears very promising. It is of strong growth.

BLACKBERRIES.

Blackberries promise a good crop. Last autumn quite a large plantation of them was put out, and they are now making a very nice growth. I am much in favor of autumn planting for this fruit and suckering raspberries, providing the work is carefully done.

NURSERY AND ARBORETUM.

The nursery and arboretum are in excellent order and the plants in them making a most satisfactory growth. Among the new plants of interest that have flowered this year is *Rubus deliciosus*, a flowering raspberry from the Rocky Mountains. It promises to be very useful as a spring flowering plant. A plate of it with description



Rubus deliciosus.—This is the name of a very pretty flowering raspberry recently introduced into cultivation from the Rocky Mountain region. We obtained small plants of it last season. They made a strong growth and flowered profusely this spring. The flowers very closely resemble the common wild rose but have pure white petals. The leaves resemble those of the currant, and the fruit is large but not edible. It flowered more than two weeks before the native rose and continued in flower much longer. Its hardiness has not been fully ascertained but it wintered perfectly last year, and as it comes to us from Colorado, it is probably sufficiently hardy for a lawn shrub in fairly good situations. It is of pretty graceful habit, and I think is destined to be very popular when once known.

appears herewith. Another plant of interest from the same locality is a very large and beautiful *Aquelegia*.

JUNEBSERRIES.

Juneberries were a good crop, but the birds being especially fond of them it is quite impossible to raise them on a small scale without covering the bushes at fruiting time with netting. The Dwarf Success variety seems to be the most productive variety yet found.

SAND CHERRIES.

Sand cherries are fruiting abundantly, both on old plants and many young seedlings.

VEGETABLES.

In the line of vegetables variety tests are being made with onions, tomatoes, sweet corn, dwarf lima and other garden and field beans. Special attention is being given to potatoes, and one acre is devoted to this purpose. Forty varieties of them are on trial and a large number of experiments are being made to determine the best method of preventing the blight and scab of potatoes. These potato experiments with varieties, and to some extent with fungicides, are being duplicated at Bethel, in Anoka county. It is believed that by this repetition in a representative potato district that the results will be much more reliable and valuable to the potato growers of the state than if only carried on at this station.

SPECIAL REPORT ON STRAWBERRIES.

The strawberry crop this year has been generally a poor one on account of the late spring frosts when the plants were in blossom and the severe drouth which commenced to be injurious when the crop was about one-third grown. At this experiment station the crop has been fairly good. I attribute our success to the fact that the beds are on a retentive soil well cultivated and, also, to the fact that the mulch was kept over the plants until as late as practicable. Our beds were not in flower until after the damaging late frosts, and the space between the rows and around the plants being heavily mulched were protected from the sun and rapid evaporation.

Our beds that produced their second and third crop were much more productive than the new beds. I account for this from the fact that last season being very dry the newly set plants did not perfect their fruit buds so well as the older and more vigorous plants of the old beds. But I would not wish to be understood as advocating the retention of old beds except where they are mowed over and renewed by plowing and manuring according to the well known practice of this station. By following the practice outlined above, we have not failed to secure at least a fair crop any year for four years at this station.

Of new varieties there is little to report, none of them having done better than the best of the older varieties. The most promising kinds for general planting are Warfield, Haverland and Crescent of the pistillate and Bederwood, Parker Earle and Enhance of the bisexual class.* The best early berry here is the Warfield, the best

*Special mention should be made of the Bederwood, which, though a little soft and rather light in color, is probably the most productive and satisfactory of any known variety for planting with the pistillate kinds.

late one the Parker Earle. The new kinds worthy of special mention are Swindle, Edgar Queen and Leader. These fruited in beds bearing their second crop. Other new kinds in the new bed did not have as good a chance as those in the old bed and should not be condemned on this account.

The strawberry beds at the station were sprayed with Bordeaux mixture in the spring, but they were very healthy and no particular benefit seemed to follow this application. However, it is my opinion that it will as a rule pay well to spray at least once with this material in the spring, though there may be occasional years when there is no apparent benefit.

In the following table and notes on varieties, bi-sexual refers to varieties of the strawberry having blossoms that are perfect, and pistillate refers to varieties having blossoms with only female organs. Varieties of this latter sort must have some bi-sexual kind planted near them or they will be unfruitful; this is important. The ratio between the two should probably be about 1 to 3; that is, three rows of the pistillate to one of the bi-sexual kinds.

VARIETIES.	Sex.	Date of blooming.	Date of first picking.	Date of last picking.	Firmness.	Vigor (scale 0 to 10).	Productiveness (scale 0 to 10).	General appearance (scale 0 to 10).
Accomac.....	Bi.	May 25	June 20	June 30	7	9	0	.....
Atlantic.....	P.	" 31	" 27	" 27	9	9	5	9
Auburn.....	Bi.	" 26	" 22	July 3	9	9	4	9
Beverly.....	Bi.	" 21	" 19	June 30	9+	9	9.5	8
Bederwood.....	Bi.	" 31	" 21	" 29	9	9	6	8
Belmont.....	P.	" 26	" 19	" 30	9	9	7	9
Boynton.....	P.	" 28	" 20	" 28	9	10	8	10
Bubach.....	Bi.	" 21	" 22	" 30	7	8	6	8
Childs.....	P.	" 31	" 21	" 30	10	10	1	9
Cloud.....	Bi.	" 21	" 19	July 2	10	9	7	10
Crawford.....	P.	" 21	" 18	" 2	9	9	9+	9
Crescent.....	P.	" 31	" 22	June 30	8	8	8.5	8
Daisy.....	Bi.	" 31	" 19	" 29	9	9	3	8
Dayton.....	P.	" 26	" 19	July 3	8	10	9+	9
Edgar Queen.....	Bi.	" 16	" 15	June 25	6	2	2	.....
Ella.....	Bi.	" 26	" 19	July 2	8	9	8	8
Esther.....	Bi.	" 28	" 21	" 2	9	9+	8+	9
Enhance.....	P.	" 26	" 21	June 30	8	9	8	9
Eureka.....	Bi.	" 26	" 19	" 27	8	7	5	9
Farnsworth.....	P.	" 26	" 19	" 29	8	8	8	8
Gem of Nehring.....	Bi.	" 28	" 21	" 27	5	4	4	.....
Gillespie.....	P.	" 31	" 21	" 30	9	7	7	7
Great American.....	P.	" 26	" 19	" 29	8	8	8	8
Great Pacific.....	Bi.	" 21	" 19	July 2	8	9	7	9
Greenville.....	Bi.	" 26	" 18	June 28	8	8	7	9
Governor Hoard.....	P.	" 25	" 21	July 3	10	9	9.5	10
Haverland.....	Bi.	" 26	" 19	June 29	9	9	5	10
Jessie.....	P.	" 26	" 21	" 27	9	8	6	8
Lady Rusk.....	Bi.	" 26	" 21	July 2	9	8	8	8
Leader.....	Bi.	" 26	" 22	June 30	8	7	7	8
Loudans No. 15.....	Bi.	" 26	" 19	July 2	8	6	6	10
Lovetts Early.....	Bi.	" 28	" 22	June 29	7	4	4	.....
Mark.....	Bi.	" 28	" 22	" 30	7	8	6	9
Mammoth.....	P.	" 28	" 22	" 29	8	9	6	9
Martha.....	Bi.	" 31	" 23	" 30	8	8	4	.....
Miami.....	Bi.	" 16	" 15	" 25	7	10	4	5
Michaels Early.....	P.	" 28	" 16	" 30	8	8	6	8
Middlefield.....	Bi.	" 28	" 21	" 30	8	7	8+	7
Muskingum.....	Bi.	" 28	" 21	" 30	8	7	8+	7

VARIETIES.	Sex.	Date of blooming.	Date of first picking.	Date of last picking.	Firmness.	Vigor (scale 0 to 10).	Productiveness (scale 0 to 10).	General appearance (scale 0 to 10).
Noble.....	Bi.	May 28	June 19	June 29	7	7	-7	9
Oliver.....	Bi.	" 31	" 22	July 2	8	10	5	8
Ona.....	P.	" 28	" 21	June 27	8	6	5	6
Oregon.....	Bi.	" 21	" 19	" 30	8	8	4	7
Oscar.....	Bi.	" 16	" 16	" 28	7	7	0	7
Osceola.....	P.	" 26	" 22	July 3	9	9	7+	5
Park Beauty.....	Bi.	" 31	" 22	" 3	9	9+	9	9
Parker Earle.....	Bi.	" 26	" 18	June 30	10	9	8+	8
Pearl.....	Bi.	" 28	" 22	" 26	8	8	2	10
Photo.....	P.	" 26	" 22	" 30	7	9+	7	7
Princess.....	P.	" 21	" 23	" 30	8	9	5	8
Princeton Chief.....	P.	" 21	" 19	" 30	8	9	8	7
Putnam.....	Bi.	" 21	" 19	" 30	8	9	8	8
Regina.....	Bi.	" 21	" 21	July 2	9	9	8	10
Roc, E. P.....	Bi.	" 28	" 21	" 2	9	8	7	10
Sandoval.....	Bi.	" 26	" 19	June 30	9	9	7	8
Saunders.....	P.	" 26	" 19	" 30	9	9	7	9
Sittle's No. 7.....	P.	" 26	" 21	" 29	9	8	7+	10
Sittle's No. 9.....	Bi.	" 16	" 18	" 29	7	9	7+	8
Sittle's No. 37.....	Bi.	" 28	" 20	" 26	8	8	3	8
Shuster's Gem.....	Bi.	" 21	" 21	" 30	8	9	7	9
Splendid.....	Bi.	" 26	" 22	" 29	7	9	7	7
Southard.....	Bi.	" 21	" 21	" 30	8	9	7	7
Standard.....	Bi.	" 21	" 18	" 29	8	9	8	8
Stevens.....	P.	" 21	" 18	July 3	9	9.5	8	8
Swindle.....	P.	" 26	" 22	June 29	10	10	6	8
Timbrell.....	Bi.	" 26	" 19	" 29	8	8	6	7
Tippecanoe.....	Bi.	" 16	" 19	" 29	8	9	5	8
Van Deman.....	P.	" 21	" 22	July 2	8	9	7	7
Waldron.....	P.	" 26	" 16	June 30	10	10	10	10
Warfield.....	Bi.	" 26	" 20	" 30	8	7	7	7
Waupon.....	P.	" 21	" 21	" 29	9	9	4	7
West Lawn.....	Bi.	" 30	" 18	" 26	8	8	6	7
Williams.....	Bi.	" 31	" 19	" 28	8	8	7	7
Wolverton.....	Bi.	" 31	" 23	July 3	9	9	4	7
Yale.....	Bi.	" 31	" 23	July 3	9	9	4	7

Accomac. Planted in new bed. Did not flower.

Atlantic. (Bi-sexual.) Fruited in beds two and three years old. Quite productive. Medium early. Foliage and growth good.

Bederwood. (Bi-sexual.) Fruited in beds two, three and four years old, and very productive in each. Blooms early and is full of pollen. Fruit medium in size. Season medium, holds on well. Growth and foliage very good.

Boynton. (Pistillate.) Early and holds on quite well, moderately productive. Nearly the same as Crescent.

Crescent. (Pistillate.) As compared with the Warfield, which is taken as the standard, is ranked about third. Fruit not as large as Warfield, but it holds out better at latter end of season. This old variety is still one of the most reliable.

Edgar Queen. (Pistillate.) Very vigorous both in foliage and growth and very productive. Fruit large. A good variety and well worthy of trial by commercial growers.

Eureka. (Pistillate.) Fruited in beds two and three years old. A very strong grower, foliage good. Fruit of good size and color and firm. Quite productive. Season very long. Worthy of trial.

Esther. (Bi-sexual.) Medium size, conical, red. Quite productive. Rather promising.

Gillespie. (Bi-sexual.) Foliage and growth poor, with little fruit.

Gov. Hoard. (Bi-sexual.) Foliage and growth good; not very productive.

Great American. (Pistillate.) Sets large quantities of fruit, but only a small part ripens. Fruited in all beds, and the results the same in each.

Greenville. (Pistillate.) Foliage and growth vigorous. Productive. Season very long. Fruit of good size.

Haverland. (Pistillate.) An excellent variety. Season very long. Yielded well in all beds. A close second to Warfield. Fruit large.

Leader. (Bi-sexual.) Very vigorous both in growth and foliage. Very productive.

Loretts Early. (Bi-sexual.) A very handsome berry of good size. Fairly productive.

Michels Early. (Bi-sexual.) An early flowering kind with an abundance of pollen. Produces very little fruit. As a pollenizer it is very good, but otherwise almost useless.

Middlefield. (Pistillate.) A fairly good grower. Not very productive.

Oma. (Pistillate.) Not very productive. Fruit red, conical.

Parker Earle. (Bi-sexual.) A very vigorous and thrifty grower. Foliage good. Season very late. Fruit large. Very productive. One of the best of the bi-sexual kinds.

Putnam. (Pistillate.) Moderately productive. Foliage and growth very good.

Saunders. (Bi-sexual.) Fruit medium to large, compact. Not very productive. Foliage not very good.

Southard. (Bi-sexual.) Medium in size, red, usually a broad conical. Fairly productive. Foliage and growth good.

Standard. (Bi-sexual.) Of but little value here.

Stevens. (Bi-sexual.) Season early, ripens well together. Quite productive. Foliage and growth good.

Swindler. (Pistillate.) Fruit large, usually quite irregular, very firm. In large clusters. Foliage and growth very good. Very productive. A very promising variety.

Timbrell. (Pistillate.) Plants large and vigorous, somewhat resembling the Bubach. I am disappointed in the amount of fruit it produced this year, which was very little, but as it fruited in the new bed and had been seriously dug into for plants I feel that it has hardly had a fair chance.

Tipecanoe. (Bi-sexual.) A fairly good berry.

Warfield. (Pistillate.) As in several previous years this variety stands at the head of the pistillate varieties. Yielded the most fruit of all the varieties. Fruit medium in size, quite dark, very regular. Fruited well in all beds.

West Lawn. (Pistillate.) Of little value here.

Waupon. (Bi-sexual.) Fairly productive.

Williams. (Bi-sexual.) Fruit medium in size, broadly conical. Clusters very large. Quite seedy. Moderately vigorous. Does not ripen on end very well. Fruited only in new bed.

ALBERT LEA EXPERIMENT STATION.

CLARENCE WEDGE, SUPT.

STRAWBERRIES.

The strawberries at this station are all from beds set a year ago, and when ready for winter cover last fall had made very fine matted rows and, on the whole, were as promising a lot as we have ever had at that season of the year. Being in a very exposed windy situation we concluded that it would not be safe to cover with straw, and decided to use a light cover of strawy horse manure, hauled from the feed stables of the city.

The winter proved to be a very trying one for newly set beds, a large share of the plants of some varieties being entirely killed and the surviving plants being much enfeebled. The extent of the injury seemed to depend more upon the variety than the depth of cover or character of the ground. The Haverland suffered the most of any, with Warfield, Parker Earle and Barton's Eclipse very badly hurt. Crescent came out far the best, with Wilson, Bederwood, Captain Jack, Bubach and Burt very good. Since uncovering this spring all varieties were much injured by the freeze of May 18th, and have suffered to an unusual extent by the drouth following. Although a generous mulch of the more solid part of horse manure was left among the plants and the space between the rows was heavily covered, the ground became so dry that large cracks opened up and there seemed no possibility that the plants could endure, to say nothing of perfecting a crop.

In the matter of resisting drouth, the Crescent again stands at the head, with Wilson and Bederwood very good, and Parker Earle, perhaps, nearly as good as Crescent. Warfield has dried up miserably and makes the poorest showing of the whole lot. If the present rains enable the Parker Earle to mature the berries set, there will be a very fair crop on the rows of that variety. At this writing, June 19th, we have enjoyed the first dish of strawberries picked from our own beds.

RASPBERRIES.

At this date all varieties are very promising and with sufficient rain will no doubt give a fine crop. We put off making our new plantation of the cap varieties this spring until the plants had made a growth of several inches, and, although we had no rain for weeks after setting, we now have the best stand we have ever had. The only care taken was to allow no root exposure and to thoroughly firm the earth in setting.

Our orchard of some 1,200 trees is set in rows running north and south about eleven feet apart in the row. The setting of raspberries above mentioned was made between the trees in the row, using three plants in each space. We think the plants will add to the health of the trees by shading their stems and the soil about them.

PLUMS AND CHERRIES.

The outlook for the plum crop is excellent. Our older trees of Desota and Forest Garden have each set a reasonable amount of fruit—the Desota requiring some thinning—which so far seems

quite free from enemies of all kinds. We are learning to like the Forest Garden better each year; although inferior to the Desota in quality of fruit, it is so regular and seasonable in its crops of large handsome plums that the trees are not enfeebled by overbearing and seem likely to endure much longer than the Desota.

We are watching with much interest our young trees of Rockford and Cheney now bearing their first real crop; they are set alternately in a single row and blossomed quite freely at about the same time. The pocket fungus thinned the crop of Cheney just about right, but scarcely touched the Rockford. Now the Rockford is seriously affected with the spot or scab, while the Cheney does not show a trace of it and is carrying a nice little crop of by far the largest plums we have seen at this time of year.

Of the plums on trial from the college at Ames, Iowa, the *Communia* has killed to the ground each winter, and the Beer and Wyzerka have been killed back so much as to plainly show lack of hardiness. We have received and topworked on strong native sprouts some promising early varieties from Thos. Frankland, of Manitoba.

We have tried both budding and collar grafting our standard Northern varieties of plum on both the native plum and the sand cherry. We find budding much the most satisfactory and think we shall prefer the sand cherry to the native plum. The bud takes as readily, starts as easily, makes a stronger growth and is much less likely to split from the stock. The use of the Mariana, Myrobolan or other foreign stocks for Northern planting, should be stopped immediately, as it is injuring the reputation of our grand varieties. Our nurseries will serve their customers and their own reputations far better by selling no plums at all, than by sending out such a worthless and disappointing article.

The sand cherries set a year ago are in many bushes fruiting heavily. The small bushes of improved Rocky Mountain cherry are also bearing a few cherries, which will be compared with the sand cherry with much interest.

APPLES.

All varieties passed through the winter in good condition, and the Duchess, Wealthy, Tetofsky, Briar Sweet and Maiden Blush, eleven to fourteen years set, are carrying heavy crops. Two trees of Whitney of same age have never borne more than specimen apples, and, being now barren, are somewhat disappointing us.

Quite a variety of younger trees from which we had hoped to sample fruit have failed us, both last year and this. The Longfield is an exception to this and seems never to fail of some fruit almost from its setting. One tree each of Recumbent and Hibernial are well loaded, other trees of the family carrying only specimen apples. Considerable blight is showing at this date, which may spread and become severe; at present it is chiefly confined to twigs of Wealthy and spurs of Tetofsky on trees that are bearing heavily. Varieties fruiting besides those mentioned above are: Charlamoff, Czars Thorn, Anis, Martha, Antonovka, Elgin Beauty, White Transparent and Talman Sweet.

LA CRESCENT EXPERIMENT STATION.

J. S. HARRIS, SUPT.

STRAWBERRIES.

The crop of 1894 at this station was very good. The season being two weeks earlier than 1893, the plants or fruit were not injured by the false chinch bug until the very last picking, but the insect is very plentiful and some plants have since suffered considerably. Owing to the drouth of last year and other causes our old or new beds were not as well filled with plants as usual, but fruit averaged larger, making nearly a full crop.

From the experience of the year we are well satisfied that it pays well to clean out and hold over beds until the second crop is taken off and no longer, and, further, that it is not expedient to keep the early runners off of newly set plants, but rather to encourage them to form plants as early in the season as possible; and that, except in very favorable seasons, a bed set with late formed plants will not give as good returns as one set with selected plants that have become well rooted before the first of September.

We had the first bloom on the Michel and Van Deman April 29, and on the Bederwood, Crescent and Warfield on May 1; but none of them bloomed very freely until May 9, when all varieties began to show more or less bloom. The first varieties showing ripe fruit were Michel and Van Deman, followed closely by Bederwood, Warfield and Crescent. Of the varieties that are well known, we got the best returns from the Warfield, Haverland and Crescent, pollenized with the Bederwood and Michel. This is the first season we have fruited the Bederwood. It appears to be a potent pollenizer and surpassed every pistillate variety, even the Warfield, in yield of fruit. The Van Deman appears to be a good pollenizer for an early variety; it is a fine berry, but does not yield enough to become a popular market berry. Michel did better than usual with us this season and gave about one-third as much fruit as the Warfield or the Haverland. First picking very fine in quality.

Doubtless, our Parker Earle is not genuine. It is a good plant maker; fruit medium to very small; pale red, soft; low in flavor, very late. Lovett has done very well; also Crawford, Saunders, Barton's Eclipse and Greenville promise well. Sandoval, Daisy, Mrs. Cleveland, Louise, Jessie and Bubach No. 5 do not with us prove reliable enough to warrant further planting of them for market purposes. We believe the most profitable sorts to grow for market are Warfield, Haverland and Crescent, pollenized with Bederwood and Lovett.

RASPBERRIES.

Our raspberries were not laid down or given any protection last winter. They had been given very thorough shallow cultivation the previous year, made a good growth and ripened up their wood early, and did not start a late growth. The blackcaps were pinched back once as soon as the canes had made a growth of two and one-half to three feet, and the fruiting canes of bearing rows were removed immediately after the last picking of fruit and were kept

clean from all weeds, and the surface soil stirred once a week with cultivator until the last week in August, and no mulch was applied, lest it might tend to stimulate a late starting of the buds. The Shaffer was given exactly the same treatment and all other varieties of reds the same, except that the young canes were not pinched or cut back, but the surplus suckers were kept out to give the remaining canes room for full development. The result was that none of the blacks were injured, except a few plants on the ends of the rows that were cut back the second time about midsummer and an occasional plant of the Nemaha that froze back about one-third of the growth but did not seem to lessen the fruiting capacity.

Of the reds, the Shaffer suffered the most, but there were enough left to produce an immense crop. The Marlboros were not injured in the least, and the Cuthberts stood up seven feet high and started this spring from the terminal buds and were subsequently cut back to four feet, and all have borne a good crop this season, and the canes are free from curl-leaf. The first ripe blacks were seen on June 20; began picking for market June 23. First ripe reds on same date on an unknown variety; fruit too small for market. First ripe Marlboros, June 23. The last picking of blackcaps is being made today, July 13, except Nemahas, which will last a week longer. The drouth has been severe and the fruit of last picking is small. The only varieties of reds that we find profitable to grow for home use or market are Marlboro, Cuthbert and Shaffer. The most profitable blackcaps to grow for market, with us, are Ohio and Nemaha. The Johnson Early, Progress and an unknown variety gave the earliest fruit. Palmer and Older are very promising; it is the first year we have fruited them. In this dry, hot season they did not hold in bearing as long as the Ohio.

Our experiment of planting rows four and one-half feet apart with plants two and one-half feet apart in the row has proved entirely satisfactory and more profitable than planting eight feet apart and raising a catch crop between. The design is to remove every alternate row after this last picking, but we are inclined to think that in the end it will be more profitable to set new beds every spring and destroy after one crop has been taken from them. The plants are easier protected than older ones, being set closer; the first crop will be a full one, and insects and disease do not gain a foothold. The canes should be pruned back to two and one-half feet and may be fastened to a wire fastened to stakes along the row. Fruit may be kept clean by heavy mulching.

Currants have borne a heavy crop of fruit this year. The Victoria seems to be a greater cropper than the Prince Albert and Long Bunch Holland. We have six plants of the North Star, donated by the Jewell Nursery Co. in 1892; they are bearing well. The fruit is large and the flavor better than any other variety we have tried, while the plant is a strong upright grower and promises to be of great value for this part of the state. It is as good a fruiter as the Fay and has none of its weak points. The dwarf Juneberry fruited this year. I do not consider it of any value except for ornament and to produce food for birds. Plums promise a half crop; apples less; grapes full crop; blackberries three-fourths crop. They will be reported later.

MONTEVIDEO EXPERIMENT STATION.

LYCURGUS R. MOYER, SUPT.

The past season was, in some respects, a trying one. A hail-storm in August did much damage to the shrubbery, in many cases peeling the bark off the young branches. A very dry autumn ensued, and the winter that followed showed some periods of great severity. When spring opened we could begin to appreciate the damage that had been done.

Perhaps the red raspberries suffered the most. Although carefully covered, they were all killed back to the ground and many even root-killed. No crop was harvested. It is possible that some disease is working on the raspberries in addition to the hail and the frost. The black raspberries did not suffer so much, but they, too, are in a very bad condition.

Dewberries and blackberries look somewhat better, but the summer promises to be too dry to mature a crop.

The Russian mulberries killed back on an average about one foot, but, nevertheless, they bloomed quite fully and have produced something of a crop.

The Juneberries came through uninjured and have produced quite a large crop. Lovett's Success seems to be the best variety I have. Native bushes taken from the granite ledges near town are, however, doing nearly as well.

Strawberries have also failed badly, as they have done for several years. Probably our dry bluff is not well adapted to strawberry culture.

CONIFERS.

Dry as our bluff land is, the conifers planted here are succeeding well. Perhaps the white spruce is doing the best of all, but the Colorado blue spruce is doing nearly as well. It does not grow quite so fast, but it is a very beautiful tree. The mugho pine from the Alps is maintaining its record as one of the hardiest evergreens we have. It is a very beautiful tree. The black spruce is doing better with us than the Norway spruce. Our native juniper (*Juniperus Virginiana*) is succeeding admirably, too. The Scotch pine seems to be hardy enough, but it is making a rather open straggling growth on our dry land. Our Austrian pine is dragging out a miserable existence, but passed last winter with rather less trouble than heretofore. It seems that arbor vitae needs a rather moister soil than ours. Some experimental trees of Siberian arbor vitae are quite promising. Hovey's golden arbor vitae has not succeeded very well. Some experimental plantings of prostrate juniper are doing very well.

WILLOWS AND POPLARS.

It seems to be becoming the fashion to find fault with the Russian willows and poplars. Perhaps they have been praised too much, but *populus celtinensis* is one of the most promising trees I have ever planted.

Bolle's poplar, too, is very fine; I doubt whether there has ever been introduced a more promising upright, white-leaved tree. *Populus laurifolia*, too, is quite promising, and so is *populus Siberica pyramidalis*.

Among these poplars, too, we received *populus betulafolia*—probably an American species—but one of the finest appearing poplars we have seen. The crack limb willow (*Salix fragilis*) is doing well in many places. The rosemary willow makes a beautiful low snow-break.

Salix laurifolia, I regret to say, has suffered greatly with us, seemingly attacked with some disease that turns the small limbs black. Among the willows, too, we received *salix vitellina britzensis* and *salix* No. 14 Vor. These willows seem to be identical, and they are a great acquisition. In winter their young branches turn the brightest red and light up a dark shrubbery as with a flame of fire.

Salix aurea is not doing well on our dry bluff, but in moist situations it is very fine.

MOCK ORANGE.

No shrub on our grounds has shown more good points than the different species of mock orange, or *Philadelphus*. Besides some old-fashioned varieties brought from the old farm in the Eastern states, we have planted *Philadelphus gracilis*, *Philadelphus cordatus*, *Philadelphus grandiflorus* and No. 144 Vor. The different species and varieties serve to materially prolong the blooming season of this most desirable and beautiful shrub.

HONEYSUCKLES.

The upright honeysuckles have all done well. My former opinion of the merits of the new Russian variety, *lonicera splendens*, is confirmed. It is a most beautiful upright shrub. The other varieties of the Tartarian honeysuckle are all doing well. The hardy climbing honeysuckle of Prof. Budd's importation, *lonicera media*, bloomed this year, but is showing some tendency to blight. The narrow-leaved *lonicera*, *Alberti*, is doing well and is an interesting shrub. It needs some support.

PEA TREE.

There is nothing new to report in regard to the *caraganus*. They are all hardy and useful shrubs and deserve to be planted generally.

BARBERRY.

The common barberry and its purple-leaved variety, as well as the Manchurian *barberis amurensis*, are all doing well. These desirable shrubs ought to be more generally planted.

MAPLE.

The white maple (*Acer dasycarpum*) is the only native maple in this part of the state. Where a water supply can be obtained the sugar maple is doing well, but it has failed on our dry bluff. Schwedler's maple and the Rittenbach maple, both, I believe, varieties of the Norway maple, were badly injured by the drouth last season, but came through the winter without further injury. The little Japanese maple, *Acer guinala*, survived the hail-storms, drouth and frosts, and came through the winter entirely uninjured. I believe it to be a decided acquisition.

BIRCH.

The white birch and the cut-leaved birch of Europe are doing well. The American canoe birch has failed for lack of moisture.

CORNEL.

The red-twigged dogwood, *Cornus sanguinea* of the nurserymen, is doing quite well, but does not seem to be so desirable as the native species, *Cornus sericea*. *Cornus mas* must be voted a failure on dry land.

BUFFALO BERRIES AND WILD OLIVES.

The buffalo berry, *Shepherdia argentea*, promises to be one of the finest shrubs on our grounds, but right beside it, the closely related Russian olive, *Eleagnus angustifolia*, is doing equally well. The silver berry, *Eleagnus argentea*, is doing well, too. These shrubs ought to be generally planted.

COFFEE TREE.

The Kentucky coffee tree is keeping up its former record for beauty and hardness. I think it ought to be generally grown in this latitude.

ELDERBERRIES.

There is nothing new to report in regard to these shrubs. The cut-leaved elder is quite tender, and so is the golden elder. Every farmer ought to raise the black-berried elder and enjoy its valuable fruit. The red-berried elder, *Sambucas racemosa*, is an ornamental shrub of great value. It deserves a prominent place in all large grounds.

CHERRIES.

Our native choke-cherry is an upright shrub of great value for ornamental purposes. The European choke-cherry, *Prunus padus*, has more of a weeping habit, and is equally hardy and desirable. The Russian cherry, Bessarabian, is a beautiful tree, but has not yet borne fruit. Ostheim, from Storrs and Harrison, and Suda, from Stark Brothers, both seem to be hardy but have not yet fruited. The sand cherry is making a vigorous growth and is a fine ornamental shrub.

VIBURNUM.

Our common snowball is doing well, but probably not quite so well as Prof. Budd's Russian variety. Our native *viburnum lentago* ought not to be overlooked by planters. It is one of the finest shrubs than can be planted on the prairies. It has lived here for ages and is well acclimated. No one need be ashamed of it because it is American.

SPIRAEA.

The old-fashioned nine-bark has been rechristened by botanists as *physocarpus opulifolius*, but for gardening purposes it may be still called a spiraea. It is a robust growing, valuable shrub, very beautiful when in bloom and interesting in fruit. *Spiraea Van Houtii* has done extremely well this season and I should call it the

best of all. *Spiraea hypericefolia* is good, but *spiraea Douglasii* seems to be quite tender. *Spiraea billardii* is in bloom at the present writing and is doing well.

ROSES.

Perhaps the most satisfactory rose that we have cultivated is the Yellow Scotch. It is very hardy. A small pink Scotch rose is very desirable, too, and is equally hardy. A white rose brought from the old Eastern farm, without any name but probably something like Madame Plantier, produces enormous quantities of fine roses without winter protection. The best climbing rose that we have tried is Seven Sisters. It is taken down and covered with earth in the winter. We consider *rosa rugosa* a desirable shrub.

LILACS.

When the beauty and hardiness of the lilac is taken into consideration, it is wonderful that it is not more generally planted. Every species of lilac that we have planted is hardy. The Japanese tree lilac lost its terminal buds last winter, but is growing well. It is not likely that it will become a tree in our cold climate.

CURRANTS.

The old-fashioned yellow flowering currant is an ornamental shrub of value, and so is No. 148 Vor, introduced by Prof. Budd. *Ribes Alpinum* seems to be hardy.

OTHER SHRUBS.

Among the more humble and modest shrubs, *potentilla fruticosa* seems to possess value. *Phellodendron*, from the Amur Valley, is standing well. A nut-bearing almond, introduced from Russia by Prof. Budd, seems to be hardy. *Ptelia trifoliata* froze back some, but is starting vigorously. The Arctic bearberry needs a moister climate than ours.

APPLES AND PEARS.

Our young Russian apple trees wintered well, and so did the Russian pears, Kurskaya and Gakovsky.

FERGUS FALLS EXPERIMENT STATION.

F. H. FIEDLER, SUPT.

In making my spring report I must remark that the first of July is rather early for this section of the state to say anything of the crops.

All the fruit and ornamental stock came through the winter in the best of condition except grapes, most of which are dead. The hail on August 19, 1893, knocked off all the new growth, and they started to grow again and continued growing in the fall until frozen; and I think the reason they are dead is that they were in the sap when winter came on.

The Russian apple orchard looks fine; no blight or insects as yet.

Strawberries will be a short crop, as we have had no rain for six weeks. Raspberries look well yet. The Warfield and Jessie strawberries are the best bearers. Cloud is a nice berry, quite productive this season and does not seem to mind the drouth. Wilson has a poor crop. Crescent set a good crop, but are too small. Michels Early will be a good male variety here, I judge, from its appearance. Bederwood, Shuster's Gem and Haverland had mostly all the berries imperfect and unsalable. Jessie and Cloud had no imperfect berries. Great Pacific did not bear.

I prefer the Jessie with the Countess as a pollenizer. It always has done well here. Bubach is very large, but not productive enough to grow for market. Countess is so soft this year I cannot sell them.

I am not one-half as much afraid of the cold winters as of the drouth in summer.

WINDOM EXPERIMENT STATION.

(Report up to July 12.)

DEWAIN COOK, SUPT.

The fall of 1893 was unusually dry here, and it was in this condition when the ground froze up. Abundance of snow fell early in December, and enough remained on the ground to give a good deal of root protection to trees and plants, and we had good sleighing all winter.

The lowest point reached by the thermometer at this station was 26° below zero. Fruit trees and plants wintered better than usual; out of over one hundred varieties of apples growing here, I am unable to find any variety that was killed back any, every variety coming out sound to the tips and growing from the terminal buds.

We have had very little blight here so far this season, and that is confined entirely to two or three varieties of blighting crabs. My last Beechers Sweet went this summer with blight. My trees are growing finely, and as a whole my orchard is healthier and looking better than ever. We had little bloom on our apple trees, and hardly any apples are now to be found on any of the trees. I must not omit to mention that one Okabena apple tree, set the spring of 1888, is now carrying seventeen large fine looking apples, which is more than any other tree of its size or age of any variety is bearing that I have growing.

STRAWBERRIES were very nearly a failure. Winter killing on new beds was quite general, and at the time strawberries were ripening, in the last days of June, we had been having four weeks of continuous drouth and the fruit was much smaller than usual. The Warfield and Enhance were about as large as usual. The frost of May 18th also destroyed some of the early bloom.

The Juneberry bore heavily and did not seem to be affected in the least by the drouth; were ripe July first. The fruit sold readily at ten cents per quart. They were much admired by every one who saw them ripe on the bushes.

CURRENTS.—While these did not bear as heavily as some years yet they were a good crop, and fruit larger than usual. This is owing, no doubt, to heavy manuring each season and to my mulching them last spring with stable manure just after the heavy rains and

to their being protected by windbreaks. Red Dutch is the variety I grow for main crop, and they are as good with me as any. The North Star has proved to be an early and abundant bearer and well worthy of trial. My main crop of currants are in their prime now; we are marketing them every day.

The White Grape are fine, and the Prince Albert and Long Bunch Holland are promising for late varieties; they are a little green yet and will keep on the bushes ten days longer.

RASPBERRIES.—While these wintered better than usual, they have the disease that has prevailed here the past three or four years, called anthracnose; and as a result our raspberry crop is very poor, and it will probably continue to be poor year after year, unless, through new varieties or new methods, we shall learn to cheaply and successfully combat this disease. As its presence is indicated mainly by the bearing canes dying before fruit is matured, many persons think it is the dry weather that is killing their raspberry bushes. I have found that by cutting back to healthy wood after they begin to grow in the spring, will stop it in that bush for the season. My best early red raspberry for home use or market is the Hansel; the Turner is also good for home use. I am growing quite a few varieties of blackcaps. I have found no varieties that I anticipate will crowd out the Souhegan or the Gregg. The Progress, I think, will be valuable on account of its vigor, productiveness and earliness, but the fruit is small. I consider the Nemaha inferior to the Gregg for late. I have several late varieties of blackcaps that are promising. We do not give any of the red raspberries winter protection; they are mostly hardy here anyway, and we cannot afford to cover them up for the winter to have them die the next summer of anthracnose. We have been marketing raspberries since the first of the month, and they will last about one week longer. The Kenyon (red) raspberry gave us some very fine fruit; we shall continue it on trial.

DEWBERRIES are looking good; our spring was favorable to their perfect fertilization. I set in my orchard a year ago the past spring five hundred Lucretia dewberry plants, and now they are bearing abundantly of the largest blackberries I ever saw. There is no imperfect fruit to be found, and they sell fast here at twenty cents per quart. My first picking of them for market was July 10.

SAND CHERRIES are growing and bearing well. Of the several varieties of Russian cherries I am growing, the Osthheim is most promising. The cherries are not ripe yet. I have some seedlings of Russian cherries that are bearing considerably this season; the fruit is in its prime now and is fine. Choke-cherries were mostly killed by late spring frosts.

GRAPES.—After all the late spring frosts they are doing remarkably well and no disease apparent. The Delaware will fruit but little; they are taking a much needed rest. The Worden is especially promising, as are also the Concord, Moore's Early and Janesville. For a white grape, although late to ripen and of poor quality, the Missouri Reisling is a marvel of hardiness, vigor and productiveness and bears every year. It seems to me that grapes are easier to grow successfully than a good many of our small fruits.

The show for a fine crop of plums is good. Some trees are unable to bear up their heavy loads of fruit. Wolf, Desota and Forest Garden are especially fine; Rollingsstone, as usual, has but little fruit.

Potatoes.

POTATO SCAB.

PROF. S. B. GREEN, ST. ANTHONY PARK.

This disease and the losses from it are so well known, that no description of it or enumeration of the loss it occasions is necessary. It attacks any and all varieties of potatoes.

The cause of this trouble has been variously attributed to wood ashes, to insects, to stable manure, to heavy and light soil, to too much and too little water in the soil and to many other causes. But very lately it has been conclusively demonstrated that, while some of these conditions may increase the amount and the rapidity of its development, yet none of them, nor any of them combined, are the first causes in producing the disease.

The real cause of the disease is a minute parasitic fungus plant, that lives in the skin of the potato tuber. The growth of it there produces an irritation which induces the healthy cells to start an extra growth to repair the injury done by the fungus. This growth, which takes place under the diseased surface skin, pushes it up, thus rupturing the cells and forming the rough surface which we call scab. In the same manner any growing healthy plant over-grows the injuries which it may receive.

That this is so is well demonstrated by the following experiments made by Dr. R. Thaxter: A smooth potato was marked with water containing the pure potato scab fungus, in the form of a monogram of the letters R. T. with the result shown in figure 1.

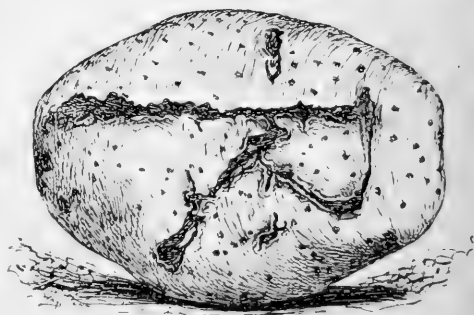


Fig. 1. Potato scab induced by inoculation in form of monogram "R. T." After Thaxter.

In another experiment, the result of which is illustrated in figure 2, one potato was marked with the pure scab fungus in the form of the letter L. In the case of the small potato in figure 2, one end of it was just touched with water containing germs of the scab fungus. In each of these cases the fungus produced the roughened surface on the skin of the potato so characteristic of scab, and that in a form to prove it the result of the inoculation, thus proving satisfactorily that scab is the result of the growth of germs in the skin of the potato.

In this connection, perhaps, it should be stated that the scab fungus will grow on the surface of a potato, if given warmth and moisture, whether the tuber is growing or not. In consequence of

this, scabby potatoes should be dug at once when matured, since, otherwise, the scab will continue to grow and to cause an increase of the injury.

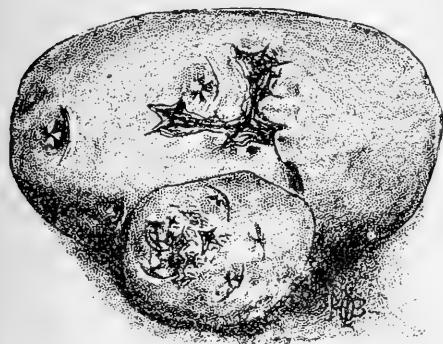


Fig. 2. Sketch of two potatoes showing the effects of artificial application of the germs of "deep scab." In the case of the large tuber the germs were taken from a pure culture and applied in the form of an L. The apex of the small tuber was merely brushed with water containing germs. Natural size. After Bolley.

Another instance showing the germ character of the potato scab and that it will live over in the soil was related to me by a gentleman from Edina Mills, Hennepin county, it having occurred on his farm in 1891.

He had a piece of land on a hillside, through which is a slight depression extending down the hill near the center of the piece. The potatoes on this land had been scabby and he thought it best to discontinue growing them on it, and, instead, broke up a piece of land just below and planted it to potatoes. At harvest he found that, extending down the hill in the form of the letter V, where the drainage from the land above would naturally flow, that the potatoes were scabby, while on the rest of the piece the tubers were clean and smooth. This is illustrated in figure 3, in which A represents

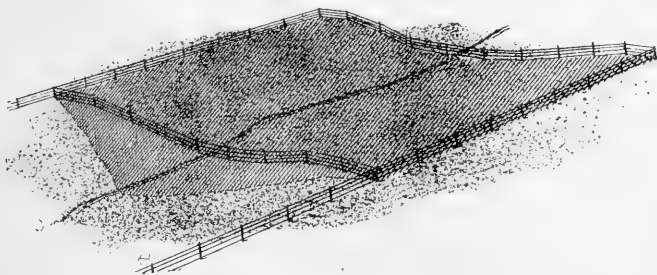


Fig. 3. Showing distribution of potato scab by drainage. The enclosure to the right and above is land infested with potato scab. The enclosure to the left and below is the newly broken land which was planted with clean seed potatoes. The V shaped part below the fence represents the part of the new land infected with scab from the field above by drainage

the land that produced scabby potatoes, B the new land that was newly broken up and C the portion of B which received the wash from the land above it, which, consequently, was infested with scab.

Our largest and most experienced potato growers take great pains to obtain and plant only such seed potatoes as are free from scab, and not to plant on land that has produced a crop of rough potatoes. These considerations are the result of constant observation of the evil attendant on such practices.

Extensive experiments made at this Experiment Station and in many places elsewhere show plainly: (1) That scabby seed potatoes almost uniformly produce a scabby crop of tubers, even if planted

on new land. There are occasional exceptions to this rule, but they do not occur very often. (2) That in old potato ground, i. e., where the scab has been harmful, the crop is almost certain to be scabby, even though perfectly clean, healthy seed is planted.

THE LENGTH OF TIME THE GERMS OF SCAB WILL LIVE IN THE SOIL is not known, but the experience of various growers would seem to show that they may live at least three or four years, and Prof. Bailey states it has been known to have seriously injured a crop of beets after an interval of five years from the time when a crop of scabby potatoes was harvested. In this connection, it is of interest to know that the disease called scab on beets is the same as scab on potatoes, and, consequently, potatoes should never follow a crop of scabby beets without an interval of at least six years, which may be long enough to permit the germs to die out in the soil; but as this time may not be long enough to thoroughly cleanse the land from the germs of the scab fungus, a longer time should be allowed to intervene whenever it is practicable.

IMPORTANCE OF CLEAN SEED.—The importance of having seed potatoes perfectly smooth and free from scab or contamination by coming in contact with diseased potatoes cannot be too firmly insisted on. It is not enough to have the seed smooth and clean as it would be were it freed from rough or injured tubers that showed signs of the disease, but if the clean seed potatoes have been in contact with those that are scabby the chances are that some germs of the disease will adhere to them and be ready to grow as soon as a favorable opportunity offers. Where there is the least suspicion that clean seed potatoes are infected, or when one is using seed the history of which is not known, the chances of injury from this source will be greatly lessened, if not entirely eliminated, by thoroughly washing the tubers in running water before planting. This may be done by placing a trough where water will run through it; into this pour one layer of potatoes at a time and rub them with a broom or brush until they appear clean and bright, even in the eyes. This will probably remove the germs that adhere to the skins. If such potatoes are planted on perfectly clean land, there is no doubt but what the crop from them will be smooth, although, even if grown from such seed potatoes, some germs may remain after the rubbing process, and the little scab thus spread may gradually increase until it becomes a source of trouble; so that, even where this method is adopted, it will be found a good plan to occasionally change the land used. A better plan would be to disinfect with corrosive sublimate as recommended for scabby seed.

SCABBY SEED POTATOES may be safely planted, provided they are first treated with some material that will kill the germs of the scab fungus on the skin. Many experiments have been made in this line with various fungicides. The most uniformly successful results have come from soaking seed potatoes before planting in a solution of mercuric bichloride. Prof. Bolley, of North Dakota, who has experimented very largely with this treatment and achieved remarkable success in its use, recommends the following method: "Procure an ordinary barrel and fit into the base a common wooden faucet. Pur-

chase of a druggist two ounces of finely pulverized corrosive sublimate (mercuric bichloride). Empty all of this into two gallons of hot water and allow it to stand over night, or until apparently dissolved. Place in the barrel thirteen gallons of water, then pour in the two-gallon solution. Allow this solution to stand in the barrel four or five hours, during which time it is several times thoroughly agitated to insure equality of the solution before using. Select as fair seed potatoes as possible, wash off all the old dirt and immerse as many as you can, or wish to treat at one time, in the solution one hour and thirty minutes. At the end of this time turn off the solution into another vessel. The same solution may thus be used a number of times, if wished. After drying, the potatoes may be cut and planted as usual. Plant upon ground that has not previously borne the disease. The potatoes may be cut before treatment, if wished.

“CAUTION: The corrosive sublimate is a strong poison, and too great care cannot be exercised in its use. The strength of the solution as here recommended, one part in one thousand, is the same as that used in surgery and is not such as to work injury unless taken into the stomach. Great care should be taken in handling the pure substance, and all treated potatoes should be planted. The solution should not be placed in metallic vessels.”

This treatment has been productive of excellent results at this experiment station. As mentioned above, care must be taken to use only wooden or earthen vessels; the corrosive sublimate will destroy metallic vessels.

Prof. W. J. Green, of the Ohio Experiment Station, states that potato scab at that station has been almost wholly prevented by soaking the seed before planting for one hour in the Bordeaux mixture. There is much other evidence to show the benefits from using this fungicide for this purpose, and, as it is quite harmless, it is well worthy of trial. At this experiment station its use has been attended with fair results, but these were not equal to those obtained where the corrosive sublimate was used.

BARNYARD MANURE THE CAUSE OF SCAB.—It has been very generally observed that where stable manure is used on potato land, the scab is often most abundant; in other words, its presence seemed to be favorable to the development of the disease. Dr. Thaxter says that he is convinced “that the practice of feeding scabby potatoes to stock is one of the most important measures by which the disease is spread on farms.” It is well known that the spores of a great number of fungus diseases pass readily through the stomach and intestines of animals without injury. It is also known that the scab fungus grows readily in manure, and it is altogether probable that these spores pass unharmed through animals fed on scabby potatoes or scabby beets. The manure that is free from these germs undoubtedly will not necessarily increase the injury from scab fungus.

CONCLUSIONS.

(1). Scab of potatoes is caused by a fungus plant working in the surface of the potato. The germs of it are very abundant and live for many years in the soil and also winter over on the potatoes. If these germs are fed to stock, they undoubtedly grow in the manure; and the use of such manure may often be a cause of infection. Al-

so, they may be spread in the soil by the natural drainage, and land receiving the drainage from infested fields may become infested even without ever having potatoes on them.

(2). Scabby seed, when planted on new or old potato land will generally produce a scabby crop, but the amount of the disease will generally be much more on the old than on the new land.

(3). Perfectly clean seed planted on land which is free from the scab fungus will always and in any season produce a crop of smooth, clean potatoes, no matter what the character of the land, but apparently clean seed potatoes may have the germs of the scab fungus on their surface. This is often the case where they have been sorted out from a lot that is somewhat infected with scab. In this latter case the tubers should at least be thoroughly washed in running water to remove any germs that may be present or, what is better yet, be treated with mercuric bichloride.

(4). Land infested by the germs of this disease will always produce a more or less scabby crop, no matter how clean and smooth the seed used.

(5). Scabby potatoes should be dug as soon as mature, since the scab fungus continues to work on the potatoes as long as they are in the ground.

(6). Scabby potatoes may safely be used for seed, provided they are first treated with corrosive sublimate, as recommended. The cost of this treatment is a mere trifle.

LATE BLIGHT AND ROT OF THE POTATO.

PROF. S. B. GREEN, ST. ANTHONY PARK.

In this state, we are yet comparatively free from serious loss from this trouble; yet, in the older sections of the state, considerable loss annually occurs to the potato crop from one or both of these troubles, and in occasional years very serious damage results from them. It is, undoubtedly, true that the loss from this cause is very generally underestimated or not considered at all. It is the object of this article to discuss this subject briefly and to give the best known methods of combating the disease.

LATE BLIGHT OF THE POTATO OR ROT.

(*Phytophthora infestans*.)

Late blight of the potato and potato rot are the result of the growing in the leaves or tubers of the potato of a fungus plant, or mildew, which by its growth robs the plant on which it grows and prevents the natural use of the food formed in the plant, and even goes so far as to break down the tissues in which it grows, causing their premature decay and death.

It has been known for fifty years. It attacks medium or late potatoes and seldom, if ever, injures early potatoes. It most generally makes its appearance in July or August, causing the leaves to die before the potatoes are more than one-half or two-thirds grown. It is most prevalent during moist, warm weather, when the fungus may often be seen as a delicate frost—like mildew on the stems or leaves of the potato vines. In seasons favorable to it, the tops of the

entire field may be killed in a very few days from the time the disease is first noticed. In seasons not very favorable to it, the tops may die prematurely, but so gradually as to be mistaken for the



Fig. 1. Late blight of potatoes in the early stages. *Phytophthora infestans*.

natural maturing of the plant. I think it most often acts in this way in this state. From the tops, the spores may pass to the tubers, where they cause them to rot.

This disease may be prevented by the use of Bordeaux mixture, to which reference will be made further on.

Figure 1 shows the way in which the disease often commences. It frequently starts at some spot on the leaf which has been injured, and from there spreads in every direction. This will many times be noticed around holes made by beetles.

EXPERIMENTS.

This subject has attracted much attention from experimenters in the older states, where the use of Bordeaux mixture as a preventive has been so successful that it has become very generally adopted by the most progressive planters. The results are not always uni-

form, as there are occasional years when it does not seem to be very destructive, but the increased assurance of a crop well warrants its use in those sections.

At the Vermont Experiment Station in 1892, the crop of potatoes was increased from a total of 99½ bushels where the tops were not sprayed to a total of 291 bushels where the tops were sprayed. This seems to many almost incredible, but where it is understood that the tops of one plant were completely dried up, while the sprayed plants were fresh and green, some idea may be had of the way the treatment works. It certainly is an extraordinary increase, even for this treatment. This condition is nicely illustrated in Figure 2 which has been kindly loaned us by that station.



Sprayed with Bordeaux mixture.

Not sprayed.

Fig. 2. View of sprayed and untreated plats of potatoes.

The Rhode Island Experiment Station increased the potato crop there in 1890 forty-eight per cent. by spraying the foliage. Several other experiment stations have received very satisfactory results in this line.

Two experiments in this line have been carried on at this station, and they have shown a considerable increase in the crop as the result of the application of Bordeaux mixture. In 1888, parallel rows of potatoes, each one hundred feet long, were treated with Bordeaux mixture, and a yield of 186 pounds per row was noted. The untreated rows yielded 143 pounds, showing an increase of 43 pounds per 100 feet. This is equal to 104 bushels per acre, or an increase of about twenty-five per cent. as the result of the treatment.

In this case, the tops of the treated row were stronger and more vigorous every way, and they remained green and fresh for two weeks after the tops of the other varieties had died.

In the summer of 1893, on the farm of Mr. Herman Schultz, which adjoins the experiment station, four rows in a piece of Late Burbank potatoes, growing on very even land, were treated with Bordeaux mixture. Shortly after the first application, the tops of the treated rows were easily distinguished from those of the rest of the field by their darker green and healthier color. This difference continued to be a very prominent, distinguishing mark until the tops were cut by frost. However, the tops of the whole patch continued to grow until cut by frost, and there was apparently little or no blight present. Yet at the time of harvest, the four treated rows yielded ten and a half bushels of merchantable potatoes, and the untreated rows adjoining yielded eight bushels of merchantable potatoes. This is equivalent to a yield of 210 bushels from the treated rows and 160 bushels from the rows not treated, which is equal to an increase of fifty bushels per acre. This increase seemed to be due to the fact that the tubers from the treated rows were of larger size than the others. In the treated rows, the potatoes were all merchantable, while in the untreated rows, there was one-half bushel of small potatoes, that is, an amount equal to ten bushels per acre.

This line of work has not been carried sufficiently far or exact enough in this state to warrant the statement that it will pay to use fungicides, but it is certainly evident that every potato grower, at least in the older portions of the state, should try the experiment in a small way the coming year.

EXPENSE OF THE WORK.

Bordeaux mixture, the fungicide recommended, is made by dissolving six pounds sulphate of copper (blue vitriol) in sixteen gallons of water, in a wooden vessel—a barrel is good for this purpose. In another vessel slake four pounds of fresh lime in six gallons of water. When this has cooled it is slowly poured into the sulphate of copper through a burlap cloth which will take out all the lumps of lime. The liquids are thoroughly mixed by stirring, when the whole should be of a sky blue color. It should be prepared a few days before using.

When used it should be diluted by adding to it about the same bulk of water. It is sometimes used at its full strength, but it is more difficult to apply when so strong, twice as expensive, and gives but little, if any, better results than when diluted as recommended. Three sprayings are generally sufficient, but in many seasons at least four should be applied, commencing when the tops are about one-half grown in ordinary years, and somewhat earlier if any signs of blight are noted on the plants. Generally, an application should be made about once in two weeks after the work is commenced.

The amount used at each application will depend on the size of the tops. For the first, about 100 gallons to the acre will be neces-

sary, and for the last two, about 150 gallons each time, making in all 400 gallons of Bordeaux mixture. The cost of materials for the above formula will be:

6 lbs. blue vitrol (sulph. copper), @7c.....	.42
4 lbs. lime.....	.01 $\frac{1}{3}$

Cost of 44 gallons.....	.43 $\frac{1}{3}$
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From the above it would appear that the cost would not exceed one cent per gallon of the mixture, but as the blue vitrol may not always be obtainable at seven cents, perhaps the cost might be a trifle more. At this price, the cost of the material to spray one acre would be about \$4.00. The labor involved will depend on the way in which the work is done, and for each application it may be considered about the same as that necessary to apply Paris green. When it is necessary to spray for the potato beetle, the Paris green may be applied in the Bordeaux mixture at the rate of one pound to 100 gallons of the mixture.

Manner of applying Bordeaux mixture.—In a small way Bordeaux mixture may be applied with a brush broom or by any of the means used for applying Paris green and water, but when the work is undertaken on a large scale, it should be put on with a force pump and a spray nozzle, as the spray nozzle divides the liquid up into a very light spray, so that the material goes much farther than if put on with a watering pot or brush broom. This can be done very cheaply and conveniently by rigging a barrel with a force pump and ten feet of hose with a spray nozzle. The barrel can be easily carried through the rows in a wagon. With such an arrangement, from two to five acres may be sprayed in one day, the amount depending on the size of the tops. A spray nozzle is very important. At the experiment station, we use what is called the Nixon nozzle, but there are several other kinds that are just as good.

SUMMARY.

(1). Late blight of potatoes is probably quite a serious source of loss to the farmers of the state.

(2). Late blight of potatoes is caused by the same fungus that brings on rot.

(3). Late blight and rot of potatoes may be prevented by the application of Bordeaux mixture to the tops of the potatoes after the vines are one-half grown.

(4). It is well worth while for growers of potatoes to experiment in the use of Bordeaux mixture for the prevention of blight and rot, although it is not recommended to treat the whole crop with it.

(5). The cost of material for Bordeaux mixture should not exceed \$4.00 per acre, and under favorable circumstances may come much below this figure.

(6). The increase in the crop from the treatment recommended may often be as much as fifty bushels per acre, and frequently much more. This increase will pay for the expense of the operation, and, as the potatoes are generally larger and smoother as the result of the treatment, it is probable the work will pay well. In some seasons, little or no results have come from the practice, but such negative results are very exceptional.

(7). The Paris green or London purple which is ordinarily applied for the potato beetle may be mixed into and applied with the Bordeaux mixture with as good results as if applied alone.

DISCUSSION.

Prof. S. B. Green: This season I treated five rows on Como avenue, near the experiment station, belonging to a farmer living there. I treated five rows, 250 feet long, right through his potato patch. After treating, I told him if there was any injury done I would see that they were well insured, but two weeks after the first treatment anybody could see the difference between those that were treated and those that were not, and those five rows that were treated yielded at the rate of forty bushels per acre more than the rest of the patch; but that was not as great a difference as there would be some seasons, because the tops were all cut off by frost. I would suggest to the society that they try the Bordeaux mixture. In applying the Bordeaux mixture you can mix it with Paris green.

Mr. Brackett: At what time do we have to make the first application?

Prof. Green: When the tops are about eight inches high. You would not get an increase on early potatoes, but on late potatoes. About the middle of July make one application, then another about the first of August and another about the 20th of August; one has to use his judgment about this. Three applications are a great plenty.

Mr. Pearce: Now, we have a spawn or germ that produces a species of smut on wheat and on corn, and I have been experimenting a good deal with wood ashes of late. I think I can prevent the smut on corn by soaking it in lye. I have done it, and I think I can destroy that germ. What would be the result of soaking our potatoes in lye or potash solution?

Prof. Green: The trouble about that would be to get it strong enough to destroy the fungus without destroying the bud.

Mr. Wedge: How is it about getting rid of the rot on the tomato?

Prof. Green: I believe the best plan is to select a situation where there is a good circulation of air, and then so far as possible select those varieties that resist the rot the most. It is well known that the Acme in some seasons is very liable to rot. The rot in tomatoes can be entirely stopped by the use of Bordeaux mixture. Some people spray with the mixture

too late; if it is done early enough it is a good preventative. Get an airy location; and, if you have not too many, you can bag your tomatoes.

Mr. Allyn: How is it they will rot when there comes a rain and they will not rot after that?

Prof. Green: The tomato is weakened and the dense air makes it liable to disease.

EDIBLE MUSHROOMS.

(From Report of 1893, U. S. Dept. of Agriculture.)

Many methods of cultivating the common meadow mushroom have been presented by different growers, but all agree as to the value of the general methods in practice. Nearly every farm and nursery affords the conditions necessary to cultivate the ordinary field mushrooms, such as sheltered sheds, stables, and small hot beds for winter cultivation, and melon patches, cucumber pits, etc., for summer culture.

Mushroom spawn in "bricks" can be easily obtained from the seedsmen. Natural or virgin spawn, which is considered by many experienced growers as preferable to the artificial, can be obtained in most places where horses are kept. It is found in half-decomposed manure heaps, generally where horse droppings have accumulated under cover. It is readily distinguished by its white filamentous character, and by its mushroom odor. When dried it can be kept for years.

Mushroom beds are easily formed on the floor of sheds, by carrying in the fresh stable dung, adding to it about one-fourth of good loam, mixing both together, pressing firmly down, and letting the mass remain about two weeks untouched. By this time the temperature will be on the decline, and when it falls to 90° F., break the bricks of spawn into pieces two inches square, and plant twelve inches apart, three inches below the surface. Then cover over to the depth of three inches with good garden soil and press down firmly.

It is recommended that mushroom beds should not be finally earthed until the spawn is seen beginning to spread its white filaments through the mass; and should it fail to do this in eight or ten days after spawning, the conditions being favorable, it is better to insert fresh spawn or to remake the bed, adding fresh materials if it be found to fail from being too cold.

It is advisable not to put the spawn at any uniform depth, but so that while one piece of it may be at a depth of six inches, or nearly so, others may touch the surface. This allows the spawn to vegetate at a depth and temperature most congenial to it. Mushrooms may be cultivated in warm cellars, in boxes about four feet square by eighteen inches in depth, for family use.

Floriculture.

DECORATIVE HORTICULTURE FOR FARMERS.

WM. TOOLE, BARABOO, WISCONSIN.

If the average farmer does not make full use of the means at hand to beautify home surroundings, it is not often so much through lack of taste as because of want of opportunity.

Perhaps, the labors of a life-time have been made up of struggles to secure a home with means of subsistence and to raise and educate a family, leaving but little time to notice that the green fields, the waving grain and wooded hillsides are all more beautiful than the immediate surroundings of his home.

Not forgetting that most farmers can spare but little time or money for home embellishment, it behooves us then to first consider such plans as give the most enduring returns for the labor expended.

The foundation for all work of this kind is grass. We will call it a lawn, of course, even though we may choose to trim it with a scythe rather than a lawn mower, or sometimes, if we have been generous in our allotment, use a mowing machine. With several cuttings in a season, the farm animals will make good use of the growth obtained, in this way making our ground earn its rent, leaving the beauty of the setting for our jewels of shrubs and flowering plants a clear gain.

We will hope that there is sufficient space between the house and road for our contemplated lawn, that it need not be all to one side, and we pray that much time need not be taken up in removing out of sight wagons, plows and other farm machinery, as well as rubbish, woodpiles and other unsightly objects, which easily accumulate out of place through hurry of summer's work or indifference of winter's forgetfulness.

While the spirit of improvement is on us it is a good plan, during some of our drives, to note the general appearance of farmers' homes, and carefully remember what should be commended and what should be avoided. Returning we will drive past our own place, and after leisurely viewing it, we may be surprised to find that we had not been familiar with our own appearance before the rest of the world. We may be surprised, too, with the possibilities for improvement.

A good preparation for our lawn is a summer fallow with plenty of manure and cultivation. An uniformly rich and mellow surface is necessary to start with, and it would be better to sacrifice an uneven patch of grass than try to nurse it into good condition. The best mixture of lawn grass seed is blue grass, and, if you feel that you must have a variety, add a little white clover seed; nothing else. Too much variety makes an uneven bunchy growth, which will be still more noticeable on your farm lawn than where the grass is frequently clipped. The seed may be sown early in September

without any coarse grain, and we will have something to mow in good season the following spring. If sowing must be left until spring, it should be done as early as possible, mixing a few oats to help break the crust when the young grass is coming up. Sow about double the quantity you would of ordinary farm grasses, or about half as much as usually recommended in the catalogues.

The seed should be harrowed in lightly and rolled, if possible. Now, as soon as there is anything to cut, whether weeds, oats or grass, cut it, and continue doing so through the season. Perhaps it has been necessary in preparing our ground to remove some stunted, neglected trees or shrubs. Better to do our work well, even though we have commenced late in life. Good results depend upon thoroughness in the start.

Next comes arranging of flower beds and planting of trees and shrubs. Do not attempt too much, as it is easier to overdo than undo. Trees we will commence with first, as we must wait longer for results, and, location of these being of prime importance, we wish nothing else in the way of our choice of place. But I had forgotten our driveway. If our approach is at one side of our lawn, it is better so than to cut our lawn in two, and may give chance, perhaps, for a graceful curve rather than a straight line. Sometimes planting a clump of shrubbery or an evergreen in the bend may be desirable to make our curve seem a necessity, but often the beauty of the arrangement will be sufficient excuse.

In planting trees we should always have in mind their probable future dimensions, and we should often plant for ornament more than show, thereby needing variety and individual beauty of specimens. The hackberry is good for ornamental planting; the honey locust is hardy in Wisconsin, and we find it a cleanly, graceful tree; our native larch gives pleasant variety, and nothing is finer than a well grown specimen of our wild black cherry. If we have had opportunity to spare fine specimens of white oak or hickory, we are glad to admire the sturdy grace of the one or the luxuriant dignity of the other. Then we have also to choose from our native birches, the cut-leaved weeping birch, native and European, mountain ash, the Russian golden willow and one or two of the poplars with evergreens in variety. For shade and variety this list may be increased with maples, basswoods and elms. For beautiful specimens on the lawn we would commend of evergreens our native hemlock, when well grown, the Colorado blue spruce and arborescens, pyramidal and globosa.

What possibilities we have with evergreens? With them we may make the home seem sombre, heavy or gloomy, or give touches of summer brightness to the winter scene; furnish back ground to many a living floral picture or even add to the beauty of the country landscape, if our situation is sufficiently prominent to be viewed from a distance. And why should we not add to the beauty of country views if, fortunately, we are so situated that we can? And might not communities even, combine their efforts to improve the opportunities which nature has given to add to the beauty of the countryside? In our own county with its many stretches of hill and valley, a few of the early settlers had the good taste to leave

standing some of the native evergreens, enough to show how the present aspect might be improved by the tree planters' art; but no general sentiment has been established favoring such landscape embellishment, and chances are that these beautiful effects will be lessened, instead of increased, as the years go by.

Except by the roadside, we must have no straight, formal or geometrical arrangement of tree planting,—rather the appearance of a scattered grove so arranged that we may see and be seen; if we would be shut in, a high board fence will answer. If we would look out our window, views must not be obscured with obstructing foliage, else regrets may mar the pleasure of our work. Roadside planting ought not to be too profuse. Shaded lanes are well for parks and village streets, but if they should become extensive in the country, they would be monotonous..

In choosing shrubbery it is well to remember that we have them with us all the time, and beauty of foliage or fruit as well as flowers must be thought of. For this reason many of our native shrubs and climbers are desirable. With a stout stake for a stem, our climbing bittersweet, *Calastrus scandens*, may be made a beautiful umbrella-shaped tree, and with ampelopsis, native clematis and moon-seed vine we have nearly all the climbers we need; but, having these, we will in time surely add climbing roses and the many showy kinds of clematis. Our native euonymus, or strawberry tree, is always pretty, and is beautiful in the fall with its showy fruit, as is also the deciduous holly, *Ilex verticillatas*. Of viburnums there are several good natives to choose from. Then, too, are the cultivated species, never forgetting spirea Van Houtii and adding bush honeysuckle, mock orange, hydrangea, lilac and others. We have even for our trying climate more to choose from than there is room for. To increase this list better consult the reports of your society and of your state experiment station, rather than depend wholly on nursery catalogues, for the word hardy in application is but a comparative term, and most of nurserymen's experience has been gained in a milder climate than ours. Shrubs ought always to be grown as shrubs. Trim them to trunks like trees, and they are robbed of their natural grace of form, while their tendency to sucker is increased. For the same reason it is desirable to grow shrubs in groups, and if we use the side of the driveway away from the lawn for a shrubbery border, we have, too, the finest of places for herbaceous perennials, where some half hardy plants would flourish, as they could not in more exposed situations. Fortunate are we if we can expand our shrub border into a background of evergreen groups, against which may be seen in winter the bright tracery of Russian golden willow sprays or in summer and winter the grace and beauty of the cut-leaved weeping birch.

Roses we must surely have, and to give them special care and winter protection as well as because they look better that way, they should always be grown together rather than scattered about or mixed with other things. Those who are not well skilled in growing plants had better buy strong two year old bushes than risk disappointment from little mailing plants which are to be had so cheaply.

Few beds should be cut in the lawn and not many shrubs planted there, and of those only the hardiest. Our beds may be filled with the most gaily colored flowers to brighten the lawn. The bed of bulbs may be succeeded later by poppies, asters or any of the bright annuals. A bed or two filled with geraniums, salvias, verbenas, petunias or phlox drummondii, will give sufficient variety.

We must give a little attention to the immediate vicinity of the house, for with our native climbers, also mountain fringe, *cobea scandens*, clematis, roses, &c., our porches may be made into fairy bowers. If our house is not so built that banking up for winter protection is unnecessary, then it should be made so another season, for we want our north side for a collection of native ferns and early wild flowers. We ask pardon if we seem too partial to our native shrubs and plants—they are beautiful, if not rare. They may yet be rare as beautiful, and to many of our friends who visit us they are so even now. When the beauties of summer are gone, and we see o'er the snow-covered world a few evergreens to remind us of summer verdure, we are grateful for the presence of flowers or even bright green leaves to make the house more cheerful; and no house is perfect in its construction or appointments if house plants will not flourish therein with proper care. Considerations of health and comfort, at least, require that our houses be fit for plants to live in.

Probably, nothing short of flowers will content us, and we may be more sure to have these with bulbs and geraniums. With our bulbs we must first have roots before the flowers come, and to be sure of these it is well to take a shallow box of sand and in it plant the bulbs nearly or quite touching each other—not more than half covering them; put these in a moderately warm, dark place, as the cellar, a dark closet or under the plant stand. Keep them watered and watch for roots. When the roots are an inch long they may be potted carefully and still kept in the cellar or other resting place until the pots are well filled with roots, and the more forward ones may be brought to the window for blooming, a few at a time. Some bulbs will need to be kept in the sand longer than others. Whatever we have for winter blooming must have been specially prepared for it. If we have bedded out in summer young geranium plants, they may be pinched back for stocky growth and potted early in September, being already budded for winter flowering. The same may be done with petunias and other plants. But if our plants have been grown for summer bloom and then cut back, we may expect only a growth of leaves to reward us.

Begonias in many varieties are fine for winter flowers. But, whatever the kind, the rule holds good, with few exceptions, that a preparatory growth for winter bloom must first be made else we have no flowers. Any plant which blooms soon after commencing to grow in the spring may be used for winter flowering, and we may have pleasant reminders of the summer by taking up in the fall a few clumps of hepatica, bloodroot, and the like. If we would have carnations or roses for winter, the rule requiring preparatory growth is imperative. But the great drawback to cultivation of these in our livingrooms is dry air and insects, particularly insects; and often the grower wonders why her plants dry up in spite of watering,

when most likely they are suffering from green fly or red spider. These should always be watched for and guarded against. Smoking and spraying are the florists' defence in the greenhouse, but they are not very successfully done in the house. There are probably many of the various insecticides in use which will help us to rid ourselves of these plant enemies, and there is one compound we have tried and are well pleased with. Sulpho-tobacco soap made by the Rose Manufacturing Company, of Buffalo. For destruction of green fly, red spider, scale and mealy bug, it has proved very effective.

We must not omit chrysanthemums. The black aphid troubles them, but they are easily got rid of. Small plants in the spring may be grown to large ones in the fall, and after blooming and cutting back the old plants may be kept long enough to yield some side shoots for future use and then thrown away, only taking up much house room when in flower and a little before. If we have a cool east window, we may have from seed blooming plants of primroses, cyclamans, cinnerarias and pansies, keeping a sharp outlook for insects and being careful about watering.

OUR NATIVE SHRUBS AND VINES FOR ORNAMENTAL PLANTING. (A TALK).

C. L. SMITH, MINNEAPOLIS.

I selected this subject because it is one that I think is more generally neglected than any other, and more generally misunderstood than any other subject pertaining to our work: "The use of our native vines and shrubs for ornamental planting." I had occasion in traveling through the country this fall to make some observations on this subject. I counted twenty farm houses that I passed in one afternoon, and seven of them had fairly good porches in front of them. It was just at the time when the early frosts were coloring our native vines and shrubs beautifully, and I did not see a vine on one of the seven porches, and from any one of those porches at that time one could have seen a beautiful picture made with autumn leaves from our native vines and shrubs. I was thinking last night when friend Dobbyn was talking about the ideal reformer, how far the ideal was away from the real, and then I thought how much some of us in this world lost, or seemed to lose, by striving after an ideal to the entire neglect of the real or practical that was right within our reach. Now, I presume I am not overestimating when I say that if one-tenth part of the money expended for foreign shrubs and vines with which to ornament our homes had been expended in planting and caring for our native shrubs and vines, that our yards and streets and our homes would be better ornamented with trees shrubs and vines than they are today. I had occasion while visiting the city of Washington to go through the parks there, and I saw something there that might be a surprise to many of you—it was to me, at least; and that was, the most beautiful specimens of trees growing in those parks were just such as we have growing wild in Minnesota.

I spoke about the twenty farm houses I passed in one afternoon where there was not a single vine over the porches, yet frequently along the roadside I passed a vine of the common ampelopsis quinquefolia, or Virginia creeper, growing over the fence, making a beautiful picture all during the summer season, and yet those people living right within sight of it never utilized it. And, again, the same is true of some of our most common shrubs. When the park system was first inaugurated in Minneapolis, the first money that was expended was sent to Eastern nurseries for shrubs to plant in the park; nearly all of them are foreign shrubs. They are nice, very nice, but they will not compare with some of the shrubs along Lake Calhoun and along the Minnehaha Boulevard. Right along the Minnehaha Boulevard there are some native shrubs and vines growing, where they grew naturally, that will discount any foreign varieties, that are pleasing to the eye, agreeable to the look, and in the spring, in the summer and in the autumn they are ahead of anything in the parks of the city that are ornamented with foreign shrubs and vines. The plea I want to make is this: We have within our reach these little things, common if you will, cheap, of course, so that everybody can afford them, and why do we not use them? I think our horticultural society when it publishes that primer that we talked about last winter, ought to emphasize the fact that our people can go out into the woods, along the streams in their own neighborhoods and find enough native shrubs and vines to make their homes perfect bowers of beauty.

Let us go just a little into details: I was talking with a gentleman of this city, a man who has traveled in Europe, a man who has made a study of parks and park systems, and he agreed with me in this, that for a tree that would color beautifully and hold its foliage for a long time, he did not know of any tree in existence equal to our large leaved poplar, that grows wild in Minnesota. We all know what the hard maple is in that respect, and when we get down to the shrubs, there is no shrub that can be planted in the dooryard that will color more beautifully under the effects of the frost than the common sumac. How many dooryards have sumac growing in them? You see young ladies and gentlemen going out on a Sunday afternoon and when they come back they are loaded with sumac leaves, and yet how many farmers have sumac growing about their dooryards? Here in the city, people cover their porches and sheds with these climbing vines. How many farm houses have been made attractive in that manner? Take the celastrus scandens, or bittersweet; how many farmers' porches have the bittersweet growing over them? And yet there is no vine growing that during the entire summer season exhibits as great beauty as does the bittersweet with its thick dark leaves and yellow flowers and beautiful in the winter with its bright golden berries. The ampelopsis is so common that I need not give a description of it. I presume it is not unreasonable to say that there is not one person out of ten that knows or realizes that that vine is growing wild around them. I have many times heard people wonder where they could get vines of the kind that grew on the church up here. They do not know what they are. Somebody comes along with a picture of the vine and

sells them for a dollar apiece. They get some and plant it, and it gets sick and dies; it will not grow around their porch. They wonder why the vine will grow so well at the church, but will not grow around their porch. We have these things growing here in our state; these common shrubs and vines and trees, within our own reach, and if we would give as much attention to the cultivation of them as we do to the foreign kinds, I think our people would be greatly benefited by so doing.

I think I have said all that is necessary to attract attention to this subject, and that is all that I expect to do. Perhaps I do not know much, but if what I do know does anybody any good, I am glad to tell it. This is the mission of our society to educate and inspire our people in regard to these little things. Friends, it was rightly said last night that horticulturists are progressive, that horticulturists are not satisfied with standing still: it was also said we have our ideals, but do not let us place our ideals too high or too far away so we cannot reach them. If we cannot have what we want, let us take what we can get. [Applause].

DISCUSSION.

Mr. Moyer: I suppose we value things somewhat in proportion to the difficulty we experience in procuring them. At our place one of our neighbors sent to Rochester, N. Y., and paid a dollar for his ampelopsis, and he undoubtedly appreciated it very much; but he might have gone down the street a half mile and dug a bushel of them, but he would not have appreciated them half so much. I think, though, I can endorse what Mr. Smith has said, and I might say there are a good many other shrubs that can be utilized. The wild viburnum is one of the finest shrubs that can be raised, so is the red-berried elder and a great many other shrubs. The *Celastrus scandens*, or bittersweet, is very common along the borders of groves, but it does not seem to do well planted near a house; I never could get it to grow on the prairie, but the ampelopsis will grow anywhere.

President Underwood: Do you find the *aristolochia* up there?

Mr. Moyer: No, sir, we do not.

President Underwood: It occurs in some parts of the state; the common name is Dutchman's Pipe.

Mr. Moyer: There is another shrub that is very fine; it grows on the bottom lands in Minnesota as far west as the Minnesota line. It keeps its foliage quite a long time in the fall, and its berries resemble the berries of the bittersweet. It is the *euonymus*, or burning bush. I have a European species, but it is not near as good as the native.

Mr. Harris: That is a very easy plant to transplant, and it grows all over the state wherever there are thickets or timber. For a good many years I had a single plant on my place, and when I came home from town, whether drunk or sober, at the right season of the year, the first thing that struck my eye was that burning bush, and it made me feel a good deal like the man who is lost trying to find his home and sees a light in the window.

Mr. Wedge: Since some one has mentioned the thorn apple, I would like to emphasize the fact that it is one of the most beautiful trees we have, and when it stands by itself it takes on a very unique appearance. There is another shrub, the lonicera, or woodbine, which is a very nice shrub for certain situations.

Mr. Elliot: One other shrub that is very pretty here is our high bush cranberry, *Viburnum opulus*. It is very easily grown and holds its berries along in the fall and is quite ornamental. Another tree is our native birch. It is the first thing that is green in the spring, and I think one or two in the doorway adds a good deal of beauty.

Mr. Smith: Prof. Hansen is here, let us get all we can out of him. They have down there a wild olive from Russia that attracted my attention; I think it is one of the handsomest things I have ever seen, and I wish he would tell us about that wild olive.

Prof. Hansen: The wild olive should be planted on every lawn. I think it has a place all to itself. The foliage is of a light silvery color. It presents quite a remarkable appearance on a lawn, and when in bloom the flowers are quite small and yellow but they just fill the air in the blooming season with a heavy honey like fragrance. There is not anything so beautiful in its season as the wild olive. It is the observed of all observers in its season, and while it is handsome at all seasons of the year, the leaves hang on quite late in the fall and their silvery appearance makes the tree exceedingly handsome. It is the easiest thing in the world to propagate. You gather the seeds in the fall and mix them with sand and put them out to freeze in boxes buried just beneath the surface so the seed will be frozen, then plant it out in the spring; the seed will perhaps not all come up the first year, but you will be apt to get quite a fair stand the first year. The Mennonites in Kansas have long hedges of it. It is beautiful for an ornamental hedge, but I think the best place for it is on the lawn. It has an upright compact head and is very beautiful.

Mr. Harris: In sending to the nursery for this shrub, should we call it the wild olive?

Prof. Hansen: It is better then to use the botanical name. When you order it is best to give the full name, the Eastern wild olive. The others are not hardy in Iowa.

Mr. Moyer: In western Minnesota, the nicest shrub we have is the wild olive. It grows very rapidly after it is well established and makes a large growth each year. In its general aspect it is much like the buffalo berry; a person would have to look twice to tell the difference.

Mr. Smith: Its resemblance to the buffalo berry is such that it makes one think of it at once.

President Underwood: How about the fruit?

Mr. Smith: I did not taste of it.

President Underwood: We have them in the nursery. They are a beautiful tree. I think there are trees there about twenty feet high.

HARDY CARNATIONS.

[L. H. BAILEY, in Cornell (N. Y.) Bulletin 61.]

There is comparatively little known in this country about hardy, or what the English call border carnations. The energy of American carnation growers has been directed almost entirely to the winter or house type. This winter or forcing type is a modern evolution from the hardy carnation, and there seems to be no reason why the two types should not succeed equally well in this country. Gardeners of foreign birth usually dismiss the hardy carnations by saying that our climate is too hot and dry for them. While there may be much truth in this position, it is also true that many, and perhaps all of the border varieties can be grown here with little trouble. Some persons have grown them with perfect satisfaction for years, and visitors to the World's Fair in early August must have noticed a glowing bed of them upon the wooded island.

In order to determine if these plants can be successfully grown with only ordinary care, such as any person can give, we secured seeds in the spring of 1892, of the following strains: Early Margaret, Self Colored, Early Dwarf Mixed Vienna, Red Grenadine, Splendid Rose-leaved, Picotee, and some others. These were sown in boxes in the green-house on the 8th of March, but they might just as well have been sown out of doors when the season opened. The plants were set in the field as the season advanced. A few of them bloomed in the fall. They were allowed to go through the winter wholly unprotected, although they grew upon bald hill-top; and the last winter was severe at Ithaca. They all wintered well, and they began to bloom about the middle of June, and gave an uninterrupted display of bright colored and interesting forms until late in August. Although the lot was a mixed one, having come from seeds, all the varieties were interesting, particularly the single flowers. If any one strain were more pleasing than another, it was probably the Vienna, which bore single and semi-double little flowers of very pure and dainty colors, ranging from ivory-white to rose-red. Some of the plants had been taken up in the fall and removed to the house for winter bloom, and here, too, the Vienna was very pleasing. These hardy carnations will live on from year to year, although so good results cannot be expected from the subsequent seasons of bloom, and it is best to raise new plants from seeds.

Obituary.

PHILIP HERZOG.

Died July 15, 1894.

Philip Herzog was born at Oldenheim on the Rhine, Bavaria. He came to America at 12 years of age and learned the cabinetmaker trade at Auburn, N. Y. He was married to Jane Halliday, of Ogdensburgh, N. Y., 48 years ago. He came west soon afterward and engaged in the furniture business at Racine, Wis. From Racine he moved to Prescott and thence to Hastings, this state. He came to Minneapolis in the year 1866 and started the manufacture of wooden fences by machinery under name of the Northwestern Fence Works, of which he was the proprietor, and which grew to large proportions under his management. When the use of fences for lawn enclosures were largely done away with the business was gradually changed into foundry and structural iron works, under the names of Philip Herzog, Philip Herzog & Son, and the Herzog Manufacturing Company, which took front rank among the manufacturing industries of the Northwest. He withdrew from the presidency of the last mentioned corporation and active business in February, 1877, since which time he has lived mostly upon his farm at Groveland Station, Lake Minnetonka, in which he took great pride and pleasure. Owing to the sickness of his invalid wife he has been residing at No. 2809, Hennepin avenue, the past year, where he was taken away by Bright's disease at 1 o'clock P. M. Mr. Herzog has always been regarded as one of our most sterling, reliable and progressive business men, and his cheery smile and pleasant greeting will be greatly missed by his many friends in the Twin Cities.

Mr. Herzog joined this society in 1888 and became a life member in 1890. He did not take an active part in the deliberations of the society, but often attended its meetings and was always much interested in its work.

Your Corner.

QUESTION.

What is the most economical method of raising water forty to sixty feet into a tank or reservoir for irrigating purposes? Name the appliance used.

WYMAN ELLIOT.

LETTERS.

"The report of the Minnesota Experiment Station and Summer Meetings is at hand, and is a most welcome publication. It is just from the experience of men dealing with nature, earnest men who are looking for good things to eat, to look at,—fruit trees. And even a new rose that I want is told of—the "Wyman Elliot." I know Mr. Elliot, I found him in Texas, in 1890. He is a New Hampshire man, from the same state that I was born in.

"Mrs. Manning and I were at Rochester, Minn., at the first fair held in Minnesota; it was a display of Minnesota fruit, and I was told that Mr. J. S. Harris had it in charge. Mr. Ford had some grapes on exhibition then, and he thought that the state would be in time distinguished for its grapes.

"You are distinguished not only in the fruit line, but in forests, ornamental trees, shrubs, etc.

"As an honorary member I am proud of our association.

"Yours very truly,

"JACOB W. MANNING."

Reading, Mass., July 6, 1894.

"We have already received the February, March, April and May numbers of the Minnesota Horticulturist, and I know that Prof. Heiges will be glad to receive it in the future. It is an interesting publication and apparently a new departure in horticultural society literature. It strikes me that the monthly publications of proceedings is a good idea, for discussion will, in this way, reach the members of your society much more promptly than you can reach them with an annual report.

"With personal regards I remain, very truly,

"WM. A. TAYLOR, Assistant Pomologist."

Washington, D. C., June 28, 1894.

Secretary's Corner.

MIDSUMMER EXPERIMENT STATION REPORTS. It has been thought best to take advantage of our monthly form of publication and make a midsummer report from our experiment stations to cover the period from January to July. This brings before you, as it were, a bird's eye view of the present condition of horticulture in our state.

These reports tell the plain unvarnished truth, and the facts are those of to-day recorded on the spot and at the time.

The advantage of such prompt publication is apparent. Much good will result from their careful perusal.

WHO IS IRRIGATING SMALL FRUITS THIS YEAR?—The extraordinary drouth during the season of ripening small fruits, following a similar drouth last year, emphasizes the necessity of providing means of applying water to the ripening fruit crops. One good soaking of the soil just at the critical times means, taking one year with another, a doubling of the crop and a trebling of the profits. It is practicable to do this with a tank and wind-mill, and some are experimenting a little in this direction. In California this method is used in part.

We should like to hear through our columns from any who are trying this, as to methods and results.

WHAT CAN YOU SEND TO THE STATE FAIR?—Very special inducements are being offered to exhibitors of fruits, flowers, etc., this year at the State Fair, meeting Sept. 10 to 15. If you have not received a copy of the premium list send to this office for one at once and turn to page 41. The premiums on fruit are arranged to allow liberal premiums to a good many exhibitors; if you cannot take first, you may take second, third, fourth or fifth. In the case of some varieties, like the Duchess, several second premiums are offered.

Look the list over carefully and check off what you can show, and plan to come to the fair. Your premiums will likely pay your expenses, and you will meet many horticulturists under circumstances which will result in much mutual benefit.

The premiums offered for fruit aggregate nearly \$700 and ought to bring out a fine exhibit even under these rather unfavorable circumstances. You remember that the Minnesota fruit sent last year to the World's Fair attracted great attention and was highly complimented, while we considered it inferior. So select the best you have and send or bring it along, and we shall still make a fine exhibit.

(Any information desired as to this department of the fair will be gladly furnished by the secretary of this society.—SEC'Y.)

GOPHER-ICIDE.

A Correction.—On page 220, July number, the reporter makes Prof. Green say that bisulphate of copper will kill gophers. It should read "bi-sulphide of carbon." Try it and report.



MINNESOTA HORTICULTURAL EXHIBIT AT WORLD'S FAIR
Taken in May, before the arrival of fresh fruits.

THE MINNESOTA HORTICULTURIST.

VOL. 22

SEPTEMBER, 1894.

NO. 8

Columbian Exposition.

(To get a full report of our fruit exhibit at the World's Fair, please read in connection with the following, an earlier report to be found on page 131, Report of this Society for 1893, where are to be found also full plans of the exhibit.—SEC'Y.)

MINNESOTA HORTICULTURAL EXHIBIT AT THE COLUMBIAN EXPOSITION.

BY A. W. LATHAN, SUPT.

(A report rendered at the Summer Meeting of the Society held June 28, 1893.)

I have the pleasure of making at this time the following partial report of the Minnesota horticultural exhibit, now being conducted under my charge at the World's Columbian Exposition, Chicago. It is not my intention to make a formal or full report, as that will be made necessarily at the close of the fair, but to give you rather, in an informal way, an account of what has already been accomplished and an outline of the plans for the continuance and final completion of the exhibit.

You will remember that at the time of the winter meeting some annoyance was felt by our members at the course of the management of the exposition in trying to change the form of our exhibit and place it upon a long, narrow table against the wall, instead of allowing the convenient and compact plan which had been prepared. It was thought best that I should make a trip to Chicago in an effort to adjust this matter, which I did, going down the day after the adjournment of the meeting. The result was a confirmation of what had been previously promised us. Upon this final assurance the work of preparation was pushed rapidly. Early in March the materials for installation were sent from Minneapolis, the work having been done, as far as possible, in Minnesota shops. Soon after, I went to Chicago and remained two weeks, occupied in getting the material on the ground and in the construction of the structure to be used there.

Upon my return, late in March, this work was entirely completed, except the last coat of paint, which was put on the day after my leaving. The Minnesota installation was at that time the only sign of preparation for the fair in the pomological department, and continued so to be up to only a few days prior to its opening on May 1st.

The fruit which had been canned as a part of the permanent exhibit, comprising some two hundred glass jars, was sent by freight, and I found it on hand at the time of my arrival there to set up the permanent exhibit, on the 26th day of April. By good fortune the jars came intact and in as good apparent condition as when they were canned the fall before—and in digression I may now say their condition has not deteriorated in any appreciable degree.

On Friday preceding the opening of the fair our ice-box received its first contribution of a ton and a half of ice, and three barrels of apples were brought down from cold storage in the city to be used at the opening of the show. This fruit was found to be in excellent condition, much in excess of my most sanguine expectations, and I may say that this has proved to be the case with nearly all the fruit placed in storage.

On the opening day of the fair, the Minnesota fruit exhibit was practically in shape, the refrigerator cases, the shelving and the revolving tables all being well filled with fruit jars and plates of apples, the whole adorned somewhat by trailing vines and a few decorative plants. It was at this time, evidently, that the photograph was taken from which the engraving was made that appeared in the May number of the Illustrated World's Fair magazine, a copy of which I have brought here for your inspection. This picture was taken without my knowledge, or possibly a few changes might have added to its attractiveness.

Since that time quite a number of additions have been made to the exhibit, all of which it is hoped add to the attraction and usefulness of the display. The object in view in preparing and maintaining this exhibit has been its general effect upon the very transitory audience that looks upon it, rather than to emphasize and call attention to any particular details therein. The benefit to the community that pays for such an exhibit depends largely upon the number of people whose attention can be attracted to it and who can be made to perceive at a glance that the state of Minnesota is growing a handsome variety of fruits. With the exception of citizens of our own state, who are really looking for Minnesota exhibits, very few of the thousands who daily pass by, pause an instant to notice any exhibit unless their attention is attracted by the whole or some special feature of it. In emphasis of the theory upon which this exhibit is being conducted, the turning tables, which are placed at either ends of the booth and revolve in opposite directions by an electric motor, containing, as they do, a variety of fresh and canned fruits and surmounted by a cluster of decorative plants and graced with trailing vines from Minnesota greenhouses, catch the eye of nearly all who pass and cause a moment's delay. These tables are surmounted by plain black crescents bearing the name, Minnesota, in gold letters. The name of the state appears in several other places, so that the public, who very largely move rapidly through this hall, receive

some impression, though more or less transitory, in regard to the fruit-growing facilities or our state.

The exhibit has been kept up from the start until now in practically the same condition, renewals of the fresh apples having been made as often as necessary by drawing from the stock in cold storage. Up to this time, of the fifteen barrels of apples stored, only eight have been withdrawn, and it seems probable that the stock will hold out until fresh apples from the crop of '93 are ready to take its place.

A few fresh strawberries have been coming in the past week, but the quality is not of the best, and it is probable that our state will not feel very much pride in this feature of the exhibit. The unfortunate character of the season, with the excessive heat and unusual drouth, having dwarfed both crop and fruit to such an extent as to make a first class exhibit in this line an impossibility. Still, with improved methods of picking and packing, which experience is rapidly teaching the shippers, we hope to make a fairly creditable showing, even of strawberries. Of the prospect of other small fruits and also of fall fruits, you are as well informed as myself and can judge of our probable ability in this direction. The outlook for grapes, from my personal observation, I take to be excellent and am very confident that in an exhibit of fall fruits we shall equal our most sanguine hopes.

A circular was sent out at the same time with the notice of this meeting, calling attention to the award of premiums and inviting the members to contribute to the exhibit with this object. As all of you have seen this circular it is not necessary for me to refer to it here, further than to emphasize the necessity of great care in the selecting and shipping of fruit, as the standard of excellence upon which awards are to be made is necessarily placed very high on account of the large amount of fruit which will be received there. An award is more likely to be made with less critical examination upon an exhibit consisting of several varieties than upon a plate of a single variety. It will probably not be best, only in exceptional cases, for plates of single varieties to be sent for this purpose.

Notwithstanding the high character of the standard adopted, Minnesota fruit is so superior in quality and appearance that I am very sanguine of our ability to secure a reasonable share of the exposition awards and shall see that full justice is done to any contributions made to compete for premiums.

There is such a wide field upon which to draw for this exhibit that it is quite impossible for the superintendent to know in all cases where the best fruit is to be had, and it will be a special favor to our society and assist radically in the furtherance of this interest if any of you who have one or more kinds of fruit of superior excellence in size or quality, or know of any person who has such fruit, would at once notify me of the variety and quantity and of whom it is to be had. It is not expected that the fruit sent in this way will be contributed gratuitously, except as far as you desire to do so. Funds are provided with which to pay for it and the extra care required in selecting and packing it; and any one from whom it is secured will

be fully compensated for all the expense and trouble to which he may be put.

There is necessarily a large amount of detail work connected with the management of this exhibit, but the labor is greatly lightened by the cheerful assistance and wholesome encouragement which it has been my good fortune to receive from all who are connected either officially or otherwise with the exhibit or the department in which it is located. The uniform courtesy and kindness of the officers connected with the pomological department of the fair should not be passed over without notice, and the Minnesota Board of World's Fair Commissioners and their efficient superintendent are contributing their share towards the easy accomplishment of the purpose of the exhibit. The words of commendation that have come to me from those who are interested in this exhibit and in a measure responsible for its success are a pleasant stimulant and encouragement in the work. The old legend, "This fruit was grown in Minnesota," which it was found necessary to place over our state fair exhibits, could very well be used at the exposition, although the words of surprise come, in the main, from people who are or have been residents of our own state. It is worthy of remark how few of the citizens of St. Paul, for instance, and even the residents of a suburban town like Minneapolis, are scarcely better informed on this subject. Many speak of the years gone by when they lived in Minnesota and did not know that any fruit could be grown there. But of the agricultural population now living in our state, all seem fairly well informed on the fruit question and not only interested but sanguine in their belief that Minnesota will yet be a fruit growing state.

In closing, I may be excused for speaking with some commendable pride of the successful working of the structure which has been prepared for the display of our fruit. The refrigerator cases, twenty-two feet long and three feet wide, with double glazed covers backed by an ice box, three feet wide, the same height and twenty-two feet in length, are accomplishing all that was expected or hoped of them. The temperature maintained therein stands at from forty-six to fifty degrees. They are proving a great economy in the preservation and handling of the fruits for which they have been so far used, and in the preservation of small fruits their value will be still further apparent. The retiring room and office connected therewith is a cool and comfortable retreat, and the balcony above is a pleasant sitting-room and offers a nice outlook for the friends and neighbors there. The turning tables are doing well the work designed of them in attracting attention; and the narrow mirrors placed above are accomplishing the purpose, as planned, of doubling the size of the exhibit, while well concealing the character of the deception.

It has been my pleasure to meet at Chicago a few of the members of this society, who have encouraged me by their kindly words and extended their assistance by timely suggestions, and I hope it may be my good fortune to meet many of you there during the continuance of the fair. It is the home of the horticulturists of our state and you are more than welcome.

My presence with you on this occasion is made possible by our fellow member, Mr. Clarence Wedge, who kindly offered to look after our interests during my necessary absence.

FINAL REPORT OF THE MINNESOTA HORTICULTURAL EXHIBIT AT THE COLUMBIAN EXPOSITION.

BY A. W. LATHAM, SUPT.

(Made at the Annual Winter Meeting of the Society, Jan. 11, 1894.)

In making this final report to the society it is not the intention to go over all the work. This has been partially described in reports which I made to you last winter and again at the last summer meeting. For a full report it will be necessary to consult those two partial reports, but as this final report is to be of a more formal nature, I will go briefly over the ground from the beginning.

It will be remembered that the Minnesota Commission made the appropriation of \$5,000 for this exhibit early in August, 1892. I immediately prepared and sent out to the members of the society and others whom I knew to be engaged in the business of growing fruit the following circular letter:

DEAR SIR:—I am now making preparation for the Minnesota horticultural exhibit at the Columbian Exposition, and would like this fall to secure specimens of all valuable varieties of plums, apples, crabs, etc., seedlings or otherwise, to be preserved in glass jars for exhibition on that occasion.

Please write me at once what varieties you can probably supply, and I will let you know soon what, if any, to send me.

Also give me addresses of persons having anything in this line unusual or extra nice.

Persons contributing this fruit will be given credit for it in the report of the exhibit, and any reasonable expense connected with the preparation and the forwarding will be refunded, if desired. Not more than enough to fill a two-quart jar of any one variety is required.

It is intended to make this exhibit as comprehensive as possible, and a fine collection of this class of fruit is especially desirable.

I also wish to secure a quantity of late-keeping apples to be placed in cold storage for use on the tables at the opening of the Exposition. Can any be secured in your locality, and from whom, and what varieties?

An immediate reply will greatly oblige

Yours in the work,

A. W. LATHAM, Sec'y.

To this letter there were many replies, and in connection with the ensuing correspondence the following circular letters giving directions, etc., were used:

DEAR SIR:—My experience so far in canning fruit for the Columbian Exposition teaches me the *absolute necessity* for the *utmost care* in gathering and packing the fruit intended for this purpose. Every little bruise or pressure shows.

Will you please then follow exactly the following directions, viz:

1. Allow the fruit to attain full size and color, without being over-ripe.
2. In picking do not touch the fruit with the hand, but place tissue paper around it and cut off the stem with scissors.
3. Pack closely in a box with plenty of cotton batting or soft paper, and send immediately by express.

I send you by mail some tissue paper for this purpose.

Yours very resp.,

A. W. LATHAM, Sec'y.

DEAR SIR:—Will you please pack to put in cold storage for the Columbian Exposition the following apples, viz: . * * * *

To be certain of their keeping well, these directions should be followed *exactly*, viz.

1. Allow the fruit to attain full size and color, without getting over-ripe.
2. Select only fairly large, well-colored, and quite perfect fruit.

3. When picking wrap each apple in a sheet of the tissue paper sent you *before laying* in the basket.

4. Pack closely in a barrel *by hand, not pouring* in, and head up *solid* to prevent shaking about.

5. Keep in a cool, open shed till orders are received for shipping.

Will you please write me *immediately*, that I may order elsewhere, if you are unable to furnish the full amount wanted of you.

The bill should be made out to the World's Fair Commission and sent to me.

Yours Resp.,

A. W. LATHAM, Sec'y.

Remember *every bruise or pressure* prevents long keeping.

This correspondence, broken only by one short trip to Rochester, comprised the work done to secure the fruit needed for canning and cold storage. Altogether there were put up about 200 glass jars, and some sixteen barrels and a few boxes of apples and grapes were sent to Chicago and placed in cold storage.

The following is a list of those from whom this fruit was secured and the name of the varieties contributed:

FRUIT SENT TO THE WORLD'S FAIR FROM THE CROP OF 1892.

Apples.

E. S. Bardwell, Excelsior—Wealthy.

J. W. Murray, Excelsior—Duchess, Briar's Sweet, Wealthy, Transcendent and Whitney.

C. Morgan, Forestville—Maiden's Blush, Quaker Beauty, Hyslop, Orange, Malinda, Wealthy, Mollie, Haas, Ben Davis, Fameuse, Duchess, Whitney, Early Strawberry, Transcendent, two seedlings and St. Lawrence.

D. K. Michenor, Etna—Wealthy, Haas, Malinda, Utter, Fameuse, Winter Seedling, three seedlings and Hyslop.

R. C. Keel, Rochester—Longfield, Gilbert, Autumn Streaked, Red Queen, Malinda, Brett, Wealthy, Brie's No. 3, Red Streaked and an unknown variety.

Wm. Somerville, Viola—Rollin's Prolific, Rollin's Russet, Red Black, Elgin Beauty, Winter White Pigeon, Brett, Rollin's Pippin, Good Peasant, Longfield, Malinda, Wealthy, Wabasha, Lieby, Vockins, Crimean, Ostrekof Glass, Alexander, Suzof, Red Anis, Hibernial, Vargul, Barlof, Pear, Antonovka, Gilbert, McMahon White and Repka.

Z. D. Spaulding, Excelsior—Wealthy and Plumb's Cider.

Andrew Peterson, Waconia—Lieby, Christmas, Cross, Patten's Greening, Good Peasant, Wolf's Seedling, Patten's Hybrid, Borovinka, Blushed Colville, Charlamof, Plinakof, Antonovka, Royal Table, Anisimonka and Green Sweeting.

S. P. Beighley, Gordonsville—Malinda.

E. D. Ames, Lyle—Seedlings.

Dewain Cook, Windom—Fameuse and Harry Kaump.

C. W. H. Heideman, New Ulm—Duchess.

Wm. Wachlin, Faribault—Duchess.

Clarence Wedge, Albert Lea—Charlamof, Barlof and Czar's Thorn.

P. H. Perry, Excelsior—Florence, Antinovka, October and Martha.

A. W. Latham, Excelsior—Duchess and Lieby.

Geo. R. Miller, Richland—Miller's No. 1 and a seedling.

Sidney Corp, Hammond—Elgin Beauty, Autumn Streaked, McMahon White, Brett's No. 2, Golden White, Plumb's Cider, Giant Swaar and Good Peasant.

Mrs. Drusilla A. Gordon, Long Lake—Whitney, Briar's Sweet, Saxton and a seedling crab.

W. J. Wickersheim, Idlewild—Early Strawberry.

J. R. Cummins, Eden Prairie—Lou, Whitney, Early Strawberry and several unknown varieties.

C. E. Older, Luverne—Duchess and Wealthy.

O. F. Brand, Faribault—Estelline, Ben Davis and Peerless.

Mrs. A. A. Kennedy, Hutchinson—A seedling, Francis and Lewis.

J. G. Bass, Hamline—Whitney and Beacher's Sweet.

H. M. Lyman, Excelsior—Four seedling crabs.

Mrs. S. Irwin, Excelsior—Wealthy.

C. Thielmann, Thielmanton—Laqua.

P. J. Frenn, Red Wing—Peach, five Duchess seedlings, one Hyslop seedling and an unknown variety.

Wm. Oxford, Freeburg—Haas, Oxford's Orange, Golden Beauty, Switzer, Walbridge, Hibernial, Hyslop, Golden Russet, Sweet Crab, Utter, Fameuse, Briar's Sweet and Annstear.

M. Pearce, Chowen—Lieby, Wealthy and Tonka.

E. H. S. Dartt, Owatonna—Dartt's Hybrid.

Ditus Day, Farmington—Quaker Beauty, Fameuse, Drake, Clara, Pickett's No. 5, Montreal Wax and Meader's Winter.

Jacob Klein, Caledonia—Duchess, Wealthy, Catherine and five seedlings.

J. S. Parks, Pleasant Mounds—Wolf River, Talmon Sweet, Snow, Walbridge and two seedlings.

W. R. L. Jenks, Alexandria—An unknown variety.

L. E. Day, Farmington—Haas, grown by Chas. Lumburg. Fameuse grown by Henry Trout. Minnesota, grown by B. Hoff. Haas, Wealthy, Saxton, Neill's Seedling, Fameuse, Orange, Meader's Winter, Quaker Beauty and one unknown, grown by himself.

Mrs. E. Cross, Sauk Rapids—A seedling.

S. D. Payne, Kasota—Duchess, Transcendent and Hyslop.

Total number of different varieties exhibited one hundred and twenty-three.

Plums.

H. Knudson, Springfield—Two varieties.

Mrs. I. Barton, Excelsior—Arctic.

Mrs. A. A. Kennedy, Hutchinson—Several varieties and prunes.

J. G. Bass, Hamline—Rockford.

F. G. Stoppel, Rochester—One variety.

R. Knapheide, St. Paul—Several varieties.

S. F. Wyman, Waseca—Lombard.

Dewain Cook, Windom—Six varieties.

S. D. Payne, Kasota—Miner and a native seedling.

Total number of different varieties exhibited about twenty.

Grapes.

O. H. Modlin, Excelsior—Iona.

H. L. Crane, Excelsior—Iona, Concord, Delaware and Brighton.

Mrs. S. Irwin, Excelsior—Prentiss, Duchess, Massasoit, Pocklington and Eumelan.

E. J. Cutts, Howard—Champion and Pocklington.

A. W. Latham, Excelsior—Iona, Delaware, Concord, Moore's Early, Lady, Agawam, Brighton, Telegraph, Worden, Duchess, Pocklington, North Carolina, Perkins, Black Hawk, Massasoit, Lindley, Salem, Martha, Cottage and Merrimac.

Prof. S. B. Green, St. Anthony Park—Prentiss, Barry, Wyoming Red, Lady Washington, Green Mountain, Crevelling, Autumnal, Woodruff's Red, Niagara, Eumelan, Elvira, Moore's Diamond, Merrimac, Early Victor, Amina, Moyer and Centennial.

Total number of different varieties exhibited thirty-eight.

Peaches.

O. H. Modlin, Excelsior—Three varieties.

Sundries.

Sidney Corp, Hammond—High bush cranberries and barberries.

E. H. S. Dartt, Owatonna—Horse chestnuts.

The above list, I believe, is reasonably accurate as showing the varieties, although not the quantity contributed. In the rush of work connected with receiving and preparing so many varieties from so many quarters, it was practically impossible to keep an accurate account of the amount of each variety contributed, and I trust the list prepared in this way will be satisfactory to the contributors.

In preparation for the work of providing a supply of fresh fruit during the months of the exposition, I sent out late in the fall the following circular letter and a blank list to be filled out, showing the location of such fruits as might be needed in making the exhibit:

DEAR SIR: Please fill out the accompanying blank with the names and amounts of the different kinds of apples, plums, cherries, raspberries, strawberries, currants, gooseberries, blackberries, cranberries, grapes, etc., you are now growing, which will be likely to bear fruit in the season of 1893.

This information is wanted for the purpose of knowing where the fruit can probably be found that will be needed in making the horticultural exhibit from Minnesota at the Columbian Exposition.

Will you have the kindness to make this a *very full list*, including seedling trees and vines. If the blank sent is too small, please let me know and I will send more.

In sending you this blank I have taken it for granted that you are willing to assist, either by sale, donation or by entry for premiums, in making this exhibit, and you will share in common with this society and our state the honor resulting from our efforts.

Please mail to me at an early day, and oblige

Yours fraternally,

A. W. LATHAM, Sec'y.

To this letter there were something over one hundred replies, and from these parties was secured almost entirely the fruit exhibited. I have preserved these lists with the thought that perhaps it might be worth while at some leisure time to arrange them for publica-

tion. They would be interesting as showing the present condition of the development of the fruit industry of our state.

I have spoken in my previous reports of the erection of our booth^a at Chicago, which was completed late in March, 1893. Regarding this the Chicago Inter-Ocean of March 24, 1893, said:

"MINNESOTA'S FRUIT EXHIBIT.—WONDERFUL DISPLAY BEING MADE BY THE POMOLOGISTS OF THE NORTH.—In the south curtain of the horticultural building Minnesota is preparing an extremely interesting pomological exhibit. This display takes added interest from the fact that Minnesota is the extreme Northern state where pomaceous fruits are perfectly developed. More than 500 square feet have been assigned that state, and A. W. Latham, secretary of the Minnesota State Horticultural Society, under whose auspices the collection was made, is now superintending the work of installation. An appropriation of \$5,000 was made by the Minnesota Legislature for the exhibit, which consists of every variety of fruit grown in the state, including apples, plums, pears, grapes, peaches, and small fruits of all kinds.

"The exhibit occupies the central portion of the east side, and from the unique manner of its arrangement will be one of the most attractive displays in the section devoted to pomology. Shelves will be arranged inside the pavilion to accommodate 700 plates of fruit. The shelves will be backed by mirrors which will reflect light upon the fruit, thereby heightening their colors and producing an illusion as to the number of specimens on each plate. Refrigerator cases will be used to show the different fruits in season, and a large refrigerator, twenty-three feet long, will demonstrate the cold storage methods of preserving the luscious morsels. A collection of photographs of fruit scenes in Minnesota will form part of the exhibit.

"At each side of the main exhibits will be placed revolving stands five feet wide and eight feet high. They will be kept in constant motion by electric motors. Upon them, in pyramid form, will be placed small fruits, and at the base of the pyramid will be native flowering plants and trailing vines. Everything employed in preparing for the exhibit is from Minnesota, including the lumber, paint, and hardware, and the work is done by artisans brought here from that state. To Minnesota is due the credit and praise of being the *first exhibitor* in the section of pomology to build a structure for exhibit."

During the month of May a number of notices of our exhibit appeared in the press, a few of which I have thought worth preserving in connection with this report, especially as they were unsolicited:

(*Chicago Evening Journal*, May 10, 1893.)

"Minnesota has an exhibit of fruit which is more interesting than many a larger display on account of the large number of new varieties which it contains, and the presence of many fruits one would hardly expect to find in such a latitude. In Minnesota they dig around the peach trees before the winter comes, and bending them down, cover them with earth to protect them from the frost. The 'Wealthy' apple is a fair sample of the many new varieties produced to suit the climate of Minnesota."

(*Minneapolis Tribune*, May 12, 1893.)^a

"The Minnesota horticultural exhibit is a source of great pride to Minnesotians, because it embraces in the display several original ideas of A. W. Latham, in charge, not embraced in the exhibit of any other state.

"Minnesota was the first state to choose space in this building and was enabled to secure a very favorable location. The exhibit is placed on shelves rising in the shape of a pyramid, underneath which is a large ice storage room. This will keep the fruits and flowers always fresh. The display of fruits is very choice, and the tasteful decoration of the shelves with cut and potted flowers makes it very attractive to all visitors. Above the exhibit is arranged a system of mirrors, which reflects the display back to the observer, making it appear twice as large as it really is. At each end of the central exhibit is a revolving pyramid kept in motion by an electric motor on which is displayed the choicest specimens of flowers and fruits in glass jars. Mr. Latham has also arranged a reception room close by his exhibit which is always kept cool by the cold storage room. The ideas of the whole exhibit are novel and exclusive."

(*Minneapolis Journal*, May 17, 1893.)

"The Minnesota exhibit is all in readiness for visitors now and is the most complete of any at the fair. Great interest is being manifested by the Chicago visitors in the fruit display from this state. The apples selected rank well with those in any of the other horticultural exhibits and are attracting much attention."

(*Erie, Pa., Morning Dispatch*, May 24, 1893.)

"Minnesota makes a good and attractive showing. The arrangement of the exhibit was made according to the ideas of Mr. A. W. Latham, secretary of the State

Horticultural Society, and superintendent of the State Horticultural Exhibit. It occupies a side space, and is arranged with an ice box and fruit storage connection that is very convenient. The shelves are flanked with mirrors. Revolving circular shelves made in pyramidal form occupy places at either end of the space, and the whole is eminently practical as well as attractive. The fruit display is also good, the pleasing effect of the outlay being heightened by a tasty distribution of cut flowers and plants among the fruits.

On the 15th of June the following circular letter was sent out in regard to the exhibition of fruit for premiums:

CHICAGO, ILLS., June 15, 1893.

Dear Friends and Members of the Minn. State Horticultural Society:

The annexed circular, to which I wish to call your special attention, is prepared for the purpose of giving you full information in regard to the award of premiums on fruits exhibited for that purpose at the Columbian Exposition, where I am now engaged in the very pleasant task of representing the interests of your society and the horticulture of the state in general.

It will be found an easy matter for each of you who is growing fruit to become the possessor of a medal and diploma from this greatest of all Fairs, and it will give me much pleasure to assist you in doing so. This possession should be a source of great pride to you, and incidentally the result would be a great improvement in the general character of the Fruit Exhibit and an increase of credit to our society and the state.

It would seem scarcely necessary for me to urge you to avail yourself of this opportunity, and at the same time assist us in making the exhibit.

Will you please place the surplus copies sent you in the hands of fruit growers not members (but who ought to be) who would be likely to be interested in securing one of these premium medals and in helping us in this good work.

Any of you visiting the Fair will find a cordial welcome at the exhibit where I hope to meet many of you.

Yours fraternally,

A. W. LATHAM.

Address: Minnesota Exhibit, Horticultural Building, Chicago.

KEEP THIS FOR REFERENCE.—INFORMATION IN REGARD TO THE AWARD OF PREMIUMS ON FRUIT AT THE COLUMBIAN EXPOSITION.

(This information is *not official*, but is the substance of what I have been able to learn on the subject.—A. W. LATHAM.)

1. A premium consisting of a medal, accompanied by a diploma duly inscribed with the name of the exhibitor, and describing the fruit exhibited and setting forth its points of superiority, will be awarded to every exhibitor who places on exhibition any fruit or fruits of merit.

2. Fruit entered for a premium will be judged separately by *its merits alone*, and not be compared with any other similar entry. There are no second premiums, but every article exhibited will be awarded a premium, if it be good of its kind.

3. Fruit entered for a premium may be single varieties or a collection of a greater or less size, as suits the convenience of the grower, and may be any of the fruits grown, from strawberries in June to apples and grapes in October. This permits the utmost latitude to exhibitors. You may enter what you have and be noticed accordingly, if worthy, with the medal and diploma. Every plate must consist of at least five specimens.

4. All fruit designed for this purpose must be sent by express to the superintendent as directed below, and the express charges will be paid by the World's Fair Commission here, and not be an expense to the exhibitor. Labels or tags to be used in shipping will be furnished when requested.

5. A statement of the entry desired to be made must be placed just under the cover of the box, not forgetting to give the name and address of the exhibitor and to label carefully all the varieties sent.

6. The superintendent will take charge of the fruit so received, attend to making the necessary entries and securing action on the part of the judges and remit medal and diploma on its receipt.

7. In consideration of the express charges being paid here and no charge being made for the care, etc., it is understood that no shipment of fruit shall be made for this purpose consisting of less than 12 pints of small fruits, or 10 pounds net of grapes, or one peck of apples, or its equivalent in other fruits.

8. On account of the high express charges, please pack in thin wood boxes, using the utmost care in securing choice specimens and handling to prevent damage. As far as practicable, all fruits should be wrapped in tissue paper and packed in dry chaff or bran. Small fruits, should be sent in pint boxes, and every precaution possible taken in packing.

9. Please notify the superintendent at as early a date as possible of your intention to make entries and of what they will probably consist. A notice should also be sent on the day of shipment.

10. Every care will be taken here to see that each shipment receives just treatment, and realizing as you must the amount of work this will place upon the superintendent, it is urgently requested that all the details here recited may be closely conformed to, and thus as far as possible reduce and simplify this work.

11. It is hoped that every fruit grower in our state will take advantage of this opportunity to display without expense the specialties grown, or any unusually good fruit that nature and careful tillage have kindly placed in their hands.

Address all express packages or mail to

A. W. LATHAM,
Supt. Minnesota Exhibit,
Horticultural Building, Chicago, Ills.

(The above address is sufficient to secure prompt delivery.)

N. B.—Please fill out and return the accompanying postal card at an early date.

It was stated in this circular that the information was not official, but consisted substantially of what I had been able to learn on the subject. To be exact about this, I will say that I prepared the circular from information received from the officers connected with the department of awards; and before sending, it was submitted to the chairman of awards in the horticultural building, and also to the chief clerk in the office of Mr. John Boyd Thatcher, Mr. Thatcher himself being absent. It received their approval as expressing the purposes of that department. Later, the entries running into the thousands, it was considered impracticable to make awards to private individuals on small exhibitions, and the policy was adopted of noticing private exhibitors only where a large number of varieties was shown. Very few awards were made in this department to individuals, and in connection with our exhibit there were only two. I have very much regretted the issuance of this circular, as it undoubtedly brought disappointment to a few who, if the plan as then provided had been carried out, would have received awards. The doings of the department of awards at the fair have been very hard to fathom, and I believe still continue to be to those of us who have further dealings with them.

On the 14th of June, Mr. W. L. Parker, of Farmington, came as assistant, and remained until the first of October. His presence made it possible for me to be away from the exhibit and feel at ease in regard to its care, as his experience at the state fairs had shown his capability in this direction. I wish to express my sense of obligation to him for his kind helpfulness.

On the 17th of June, I left the fair for a short visit at home to be present at the summer meeting, Mr. Clarence Wedge of Albert Lea, kindly consenting to occupy my place. This brings me down to the termination of the period covered by the report rendered at the last summer meeting.

During the month of June a large number of notices appeared in the press, mostly of our own state, some of which may be of interest to preserve and are here reproduced:

(*Minneapolis Journal*, June 2, 1893.)

"THAT FRUIT EXHIBIT—MINNESOTA HAS A CRACK SHOW IN HORTICULTURAL HALL.
Special to The Journal.

"World's Fair Grounds, June 2.—Prof. O. V. Tousley stopped in front of Minnesota's fruit exhibit in the Horticultural Building the other day with a significant chuckle (so characteristic of him) and exclaimed: 'It does beat all how much fruit can be produced in a state that is supposed to be non-fruit producing.'

"The fruit exhibit of the North Star state is indeed a revelation and is so systematically and compactly arranged as to be set off to the best possible advantage. There are now 125 varieties of apples, grapes, pears, peaches and other fruit in the exhibit. Strawberries will be added about June 15, and the collection might have been much more complete if sufficient notice had been given Superintendent Latham last year to 'put up' the numerous small fruits of the state. The display, however, is an admirable one, and next to California's and other leading fruit-growing states, is the best in Horticultural Hall. It is arranged so as to rest against the east wall of the building in the form of glass cases. Above these cases, glass jars of preserved fruit are placed in tiers, and at each side of the exhibit are large revolving stands filled with the same jars of preserved fruits. The top of the exhibit is in the form of a cosy little 'roof-garden,' as it were, with seats for all Minnesotans who may choose to tarry there. This, as well as the revolving stands, is adorned with vines and cut flowers, which add greatly to the tastefulness of the display. Underneath the entire exhibit are ice chests opening into refrigerator cases in such a way that a circulation of air and radiation is attained with the result of great economy in the preservation of fruit. An electric motor is also placed here, by which the revolving stands are kept in constant motion.

"But the cleverest device in connection with the exhibit is a series of mirrors inclined at such an angle that all the fruit is reflected and the size of the display much magnified thereby. Illinois, whose exhibit is opposite, has copied this device, but has so overdone the mirrors that they not only reflect her own fruit but that of Minnesota also. Illinois has also complimented Minnesota by copying almost entirely after the North Star state in the arrangement of her exhibit.

(*St. Paul Pioneer Press*, June 13, 1893.)

"In Horticultural Hall, Minnesota appears to excellent advantage. A. W. Latham has charge of the exhibit. His arrangements are so perfect that Illinois has copied his general plan exactly. It is right opposite. They used a larger mirror, and in an upright position, and have carried our exhibit by means of this glass into theirs, but give us theirs in the same manner but to a less extent. Whether this was done by design does not appear, but Illinois is not ashamed of the borrowed reflection. Over 140 varieties of Minnesota fruit is shown, including twenty-five varieties of apples. The booth is a refrigerator, practically, and will keep the fruit in a perfect state of preservation for a month, and the place of that decayed can be refilled from time to time from the cold storage. Of course Idaho, Washington, Oregon and California cover more space and make a greater noise as to their fruits, but when it comes to practical utility Minnesota fruits are in the race for competition, and are in it to stay, without fear of results."

(*Minneapolis Tribune*, June 16, 1893.)

"THE MINNESOTA HORTICULTURAL EXHIBIT ENTERED.

"Jackson Park, June 16.—[Special.]—A. W. Latham, in charge of the Minnesota horticultural exhibit, has entered the Minnesota display upon three separate points as follows:

"First—The structure used in making the exhibit, including an ice box, refrigerator cases, reflectors, cones, electric motors, etc.

"Second—General exhibit of canned and fresh fruits, including condition and arrangement with decorations.

"Third—Collection of canned apples, peaches, plums, grapes, etc., 200 jars.

"There have been some changes lately in the the exterior arrangement and decoration of the Minnesota horticultural exhibit. Trailing vines from Minnesota and natural flowers from the same state now form a feature of the display as a decoration to the exhibit. The flowers are sent from Minnesota chiefly by J. M. Underwood, of Lake City, president of the State Horticultural Society."

(*Minneapolis Journal*, June 20, 1893.)

"Minnesota's exhibit has previously been described. The North Star state shows up to splendid advantage, with 75 varieties of apples, 40 of grapes and several varieties of peaches and plums. Think of peaches raised in Minnesota!"

(*Little Falls Transcript*, June 23, 1893.)

"MINNESOTA'S CHOICEST FRUIT.

"Minnesotians are not the only people who stand amazed when they pause beside our exquisitely gotten up exhibit in horticultural hall. This exhibit contains 75 varieties of apples, and Mr. Samuels, chief of the building, says 'that in no climate are more attractive apples grown.' About 40 varieties are of grapes, a few varieties of peaches, plums and small fruits. In their season these small fruits

will be shipped fresh at frequent intervals and will be kept in cold storage right in the booth where they are on exhibition."

(*Minneapolis Journal*, June 29, 1893.)

"MINNESOTA'S STRAWBERRIES NEAR THE TOP.

Special to the Journal:

"World's Fair Grounds, June 29.—Wisconsin's strawberries are not in it compared with those now being received from Minnesota. They are, next to the New York and New Jersey strawberries, the juiciest and largest display in the entire fruit section of the Horticultural building."

(*Mankato Free Press*, June 30, 1893.)

"MINNESOTA AT THE FAIR.

"In the various buildings upon the grounds, devoted to the various lines of exhibits, Minnesota makes an exhibit which need cause no resident of the North Star state to feel ashamed. As one stands before the booth occupied by Minnesota in the horticultural hall, he cannot help but be surprised at the showing which the state makes in the matter of fruit. The idea which has prevailed among people generally that Minnesota is not a fruit state is here dispelled, and he finds about everything outside of the fruit of the southern climate here exhibited. There is a great profusion in varieties of apples, and nowhere can finer ones be raised, while small fruits and grapes in great abundance are shown. As the season advances, fresh fruits of every kind will be shown. The result of our fruit display is a revelation even to those interested in fruit culture."

From this time on the record is more or less one of disappointment. As far as the state of Minnesota is concerned, the season proved to be probably the most unfavorable for good fruit in the history of the society.

On the 21st of June the first strawberries came to the exhibit in two lots. In the record I see that both lots are marked worthless; the cause of this may have been in part inexperience in packing, but was more from the character of the season, extreme heat combined with extreme drouth not only diminishing the size of the fruit, but softening it and decreasing its keeping qualities and its ability to stand the rough handling of the express companies. Later shipments of this fruit, packed in alternate layers of cotton wadding (which was found the best method of sending it), came in rather better condition, but the whole strawberry season was a very discouraging one to the Minnesota exhibit, and portended an equally unsatisfactory show of later small fruits. The *Minneapolis Journal* speaks at one time of our "fine strawberries" as compared with those of other state exhibits around us. We had the great advantage of exhibiting our berries in the refrigerator cases, where they showed better than on the open shelves, and held up well for some weeks after the same varieties had disappeared from the neighboring exhibits.

Arrangements had been perfected that would have given us a bountiful supply of all varieties of fruits had the season been at all propitious, but under the circumstances very few growers could be induced to send to the great fair what they knew to be inferior and really unfit to exhibit, and but for the fidelity of a few, amongst whom it will be no invidious distinction to name President Underwood and Prof. S. B. Green, it would have been almost impossible during the small fruit period to have kept up the exhibit with credit.

Notwithstanding the unfortunate conditions, twenty-seven varieties of strawberries were shown. No premium was awarded to us on strawberries, nor were we entitled to one. The same remark applies

to the exhibit of currants, ten varieties, and gooseberries, two varieties. A fairly good exhibit of raspberries was made, including twenty-two named varieties and many seedlings, and on this fruit the state received an award, to which it was fairly entitled. The fruit shown was by no means equal to that of ordinary years, though it compared well with any other state exhibit. There is no doubt that had it been a good fruit season our state would have come through this portion of the exhibit with the greatest credit. Of blackberries only five varieties were shown, but in sufficient quantity to make a good showing until about the first of October. The dry, hot weather still continuing affected equally this with the other small fruits.

The visit home to which I referred terminated on July 6th, from which time to the 10th of August, I was personally in charge of the exhibit. At that date I again returned to Minnesota, as it seemed very necessary that I should, in the interest of securing fruit for the fall exhibit. The answers to inquiring letters as to plums and apples were of a most discouraging character and I feared that, without extraordinary efforts, we should be unable to make an exhibit of even a very limited number of varieties. Soon after my return, I prepared what I felt like calling a "forlorn hope" circular letter, a copy of which here follows:

Read very carefully.

EXCELSIOR, MINN., Aug. 15, 1893.

DEAR SIR:

It seems almost impossible to find a sufficient number of varieties of apples and plums this very unfavorable year to make a creditable exhibit at the World's Fair, and to accomplish this absolutely demands the co-operation of every member of our society. Two of us are making personal efforts to find this fruit, but so far without sufficient success; but I still believe it is to be found, and that if all of our members will promptly respond to this call a sufficient number of varieties will be secured. As only four or five apples—or one-half pint of plums—of any one variety are needed, if you have any fruit at all, it is likely you can find that many specimens. Of course, we do not want to exhibit anything that is absolutely inferior; but if it is of fair size and reasonably free from blemish it will have to answer, even though it is not up to the standard of good fruit years.

We do not need Duchess or Wealthy, as we have found plenty of those varieties, but every other variety of apples, crab apples and plums, including especially seedling apples, of which we are very desirous of making a large exhibit.

Will you not take a few hours the *very day you receive this* to look over your own orchard and any others near you, and fill out and mail the enclosed postal, if possible, by return mail. I will let you know then at once what kinds to send, and you can forward them as fast as they ripen. Full directions for packing and shipping, also shipping tags, will be furnished you.

A record will be kept of the varieties furnished and name of contributor, which will go into our next published report, and whatever expense you are put to in this connection will be willingly paid.

Will you not please give this very important matter immediate attention?

Yours fraternally,

A. W. LATHAM, Sec'y.

In this circular I felt it necessary to make a very earnest appeal to our members and all interested in the credit of our society and the exhibit to come to the rescue and send what they had. Scarcely any one, I knew, had any really first class fruit, and every one was unwilling to send anything else, the result being that we were getting and were likely to get very little. In reply to this appeal the friends of

horticulture came to the front in great shape, not all with good fruit, but, in the emergency, all with willing hands. That you may realize something of the difficulty of the situation, I will give four of the replies to the above circular, all dated August 30th:

"I can send you four apples of each of the following varieties: Peach, Duchess and Duchess seedlings, four varieties. Apples are all small this year. Very few trees have any apples. I am willing to do all I can for the exhibit. Am sorry I have not got the supply I had last year." Signed, P. J. Frenn, Red Wing.

"Mr. Latham—I have been round the neighborhood considerably and can find nothing in the fruit line that would be of credit to Minnesota at the World's Fair. D. V. Plants, Long Lake."

"Dear Sir—There are no apples or plums to be had here. W. B. Strom, Hector."

"Dear Sir—No fruit of any kind to be found in this locality. Yours truly, O. K. Opjorden, Milan."

These are a pretty fair average of the replies, but by the help of a large number of contributors and considerable hustling on the part of Mr. F. G. Gould, who aided very materially in gathering the fall fruits, we managed to get together in number of varieties, at least, a fairly creditable exhibit. Of plums there were shown forty-one named varieties, besides a great number of seedlings; and of apples, including crabs and hybrids, ninety-one named varieties, besides a large number of unnamed seedlings. It was a pleasant surprise that in the case of both apples and plums, premiums were awarded; though considering their size, color, perfection of form and freedom from blemish, there is no occasion for pride when we remember the Minnesota apples and plums that have almost invariably been shown at our former exhibitions.

Fortunately, there were secured a few bushels of fairly well colored Duchess and Wealthy apples, and on these, especially the Wealthy, we had to rely in making the exhibit attractive. The beautiful Wealthy apples, far the handsomest apple shown in the horticultural building, interspersed with plates of our fine Minnesota grapes, were the redeeming features of our fall exhibit.

The grape exhibit was a highly creditable one, the number of varieties shown being fifty-two. While not up to the highest standard of Minnesota grapes, yet they were most excellent and attracted a great deal of attention. The judges stated that our Concord and Delawares were the best of their kind they had ever seen. As these are the two standard varieties of the country, it would seem that no higher compliment need be desired. Of course, the state received an award on grapes.

A list is here given of the contributors to the fruit exhibit from the crop of 1893 and the names of the varieties contributed. As in the list for 1892, I have not undertaken to give in detail the dates of the various shipments or the quantity contributed. It would make too cumbersome a report and would not be of special interest to the public:

FRUIT SENT TO THE WORLD'S FAIR FROM THE CROP OF 1893.

Strawberries.

Jewell Nursery Co., Lake City—Crescent, Bederwood, Warfield, Jessie, Sharpless, Princess, Belmont and Mt. Vernon.

J. C. Kramer, La Crescent—Princess, Enhance, Swindle and Leader.

M. W. Cook, Rochester—Crawford, Bubach, Haverland, Bederwood, Jessie and Gillispie.

Prof. S. B. Green, State Experiment Station, St. Anthony Park—Gillispie, Gandy, Swindle, Warfield, Lady Rusk, Daisy, Lovett's Early, Pearl, Shuster's Gem, Williams, Edgar, Queen, Putnam, Saunders, Sandoval and many varieties of seedlings.

Thos. Redpath, Long Lake—Gandy.

Total number of named varieties exhibited (not including seedlings), twenty-seven.

Raspberries.

Jewell Nursery Co., Lake City—Clarke, Marlboro, Reliance, Cuthbert, Gregg, Ohio, Shaffer, Golden Queen, Johnson's Sweet and Nemaha.

C. W. Sampson, Eureka—Cuthbert and Turner.

Thos. Redpath, Long Lake—Marlboro, Hilburn, Souhegan, Shaffer, Palmer and a seedling.

M. W. Cook, Rochester—Cuthbert, Shaffer, Marlboro, Turner and Caroline.

J. W. Finch, Eden Prairie—Cuthbert and Hansel.

Prof. S. B. Green, St. Anthony Park—Shaffer, Caroline, Reliance, Gregg, Lovett's Black, Hansel, Cromwell, Kansas, Turner, Cuthbert, Progress, Marlboro, a large number of seedlings of the Shaffer, and the Palmer, Superlative and Turner.

J. S. Harris, La Crescent—Nemaha, Marlboro, Shaffer, Cuthbert and a yellow seedling.

G. H. Prescott, Albert Lea—Hansel, Gregg, Progress, Nemaha, Older, Ohio, Turner, Cuthbert, Golden Queen and Caroline.

H. L. Crane, Excelsior—Doolittle and Cuthbert.

Total number of named varieties exhibited (not including seedlings), twenty-two.

Currants.

Prof. S. B. Green, St. Anthony Park—White Grape, Stewart, Red Dutch and Fay.

Dr. M. M. Frisselle, Eureka—La Versailles.

C. W. Sampson, Eureka—Red Dutch and La Versailles.

Jewell Nursery Co., Lake City—North Star, Fay, Red Dutch and Cherry.

Mrs. A. A. Kennedy, Hutchinson—Red Dutch and White Grape.

J. S. Harris, La Crescent—White Grape, Long Bunch Holland and Victoria.

Clarence Wedge, Albert Lea—Lee's Prolific, White Grape and Fay.

H. L. Crane, Excelsior—Stewart.

Total number of named varieties exhibited, ten.



MINNESOTA FRUIT EXHIBIT AT WORLD'S FAIR.
With refrigerator covers raised. Taken October 13, 1893.

Gooseberries.

Prof. S. B. Green, St. Anthony Park—Downing.
 Clarence Wedge, Albert Lea—Houghton and Downing.
 H. L. Crane, Excelsior—Downing.
 Two varieties shown.

Blackberries.

Jewell Nursery Co., Lake City—Snyder, Wilson's Early, Ancient Briton, Stone's Hardy and Taylor.
 H. L. Crane, Excelsior—Snyder.
 P. H. Perry, Excelsior—Ancient Briton.
 Five varieties shown.

Peaches.

J. T. Furber, Madelia—Wager.

Plums.

Joshua Allyn, Red Wing—Three varieties.
 Wm. Oxford, Freeburg—Several varieties.
 O. M. Lord, Minnesota City—Cheney, Conequa, Le Due, Rollingstone, Cottrell, Rockford, Wolf, New American, Yellow Sweet, Forest Garden, Hawkeye, Kopp, Harrison's Peach, Weaver and a seedling.
 A. W. Latham, Excelsior—Weaver, Latham and Harrison's Peach.
 S. D. Richardson—Winnebago City—Desota, Forest Garden, Large Red and one unknown.
 Wm. Mackintosh & Son, Langdon—Weaver, Desota and Forest Garden.
 J. S. Harris, La Crescent—
 Cheney and several seedlings, grown by F. J. Stoppel, Rochester.
 C. Thielmann, Thielmantion—Several seedlings, Thielmann, Golden Tips, Wild Red, Evergreen and Lovely.
 E. C. Hazleton, Nichols—Champion and sundry native.
 R. Knapheide, St. Paul—Several varieties.
 Prof. S. B. Green, St. Anthony Park—Sundry varieties, Forest Garden and Cheney.
 John Hunter, Anoka—Several varieties.
 Dewain Cook, Windom—Wolf, Desota, Wolf's seedlings Nos. 1, 2, 3, and 4, Cheney, Wood, Rollingstone, Forest Garden, Weaver, De Witt, Stray, Blue Victor, Speer and several varieties of wild.
 J. M. Doudna, Alexandria—
 Weaver, grown by A. P. Erickson, Alexandria.
 Weaver and an unknown seedling, grown by A. O. Nelson, Alexandria.
 B. C. Yancey, Edina Mills—Miner, and several native unnamed.
 Wm. Sarver, Excelsior—One variety.
 J. A. Howard, Hammond—Several varieties.
 Edward Hyland, Rosemont—Peach, Wild Goose, Green Egg and two unnamed.
 F. M. Crosby, Hastings—
 Gergen, raised by N. B. Gergen, Hastings.

J. G. Bass, Hamline—Rollingstone, Desota, Rockford and a seedling.

Mrs. E. Cross, Sauk Rapids—Weaver.

John Kendall, St. Peter—Four seedling varieties.

John Eklof, Cokato—Weaver and Desota.

S. D. Payne, Kasota—Three varieties of native.

C. F. Brown, St. Peter—Miner.

Dan'l Buck, Mankato—Several varieties.

C. A. Sundberg, Worthington—Ocheeda.

H. J. Ludlow, Worthington—Three varieties.

M. C. Bunnell, Newport—

Seedling, grown by Mrs. David Smith, Inver Grove.

Seedling, grown by Geo. Jehu, Hastings.

Desota, grown by Geo. Baldwin, Hastings.

W. H. Jessup, Tracy—Shetek.

L. E. Day, Farmington—Several varieties.

F. J. Stoppel, Rochester—One variety.

Total number of different named varieties exhibited (not including a large number of unnamed seedlings), forty-one.

Grapes.

Jewell Nursery Co., Lake City—Janesville, Moore's Early, Delaware and Brighton.

A. W. Latham, Excelsior—Moore's Early, Lady, Wyoming Red, Delaware, Worden, Cottage, Hartford, Brighton, North Carolina, Massasoit, Agawam, Amina, Herbert, Lindley, Black Hawk, Martha, Telegraph, Perkins, Salem, Concord, Duchess and Empire State.

E. J. Cutts, Howard—Janesville and Champion.

P. H. Perry, Excelsior—Talman, Massasoit, Duchess, Worden, Agawam, Concord and Iona.

Mrs. I. Barton, Excelsior—Pokeepsie Red, Early Victor, Wyoming Red, Croton, Jessica, Niagara, Ulster Prolific, Woodruff's Red, Eldorado, Duchess, Pocklington and Empire State.

A. A. Bost, Excelsior—Moore's Early, Lady, Martha and Brighton.

C. W. Sampson, Eureka—Delaware, Lady, Concord and Moore's Early.

Prof. S. B. Green, St. Anthony Park—Green Mountain, Catawba, Elvira, Pocklington, Lady Washington, Milh's Black, Faith, Creveling, Eumelan, Amina, Challenge, F. B. Hayes, Barry, Moore's Diamond, Elsingburg, Herbert, Conqueror and Centennial.

J. M. Doudna, Alexandria—Concord, Janesville and Martha, grown by J. B. Cowing, Alexandria.

Mrs. S. Irwin, Excelsior—Vergennes, Cottage, Hartford, Eumelan, Pocklington, Telegraph, Prentiss and Jefferson.

Daniel Buck, Mankato—Eldorado.

M. Pearce, Chowen—Agawam, Brighton, Wilder and Concord.

Mrs. Jennie Stager, Sauk Rapids—Several varieties.

H. L. Crane, Excelsior—Concord, Iona, Eumelan, Brighton, Duchess and Lindley.

Chas. Luedloff, Carver—Beauty of Minnesota.

M. C. Bunnell, Newport—

Concord, grown by Jacob Bender, Inver Grove.

Total number of different named varieties exhibited, fifty-two.

Apples.

Sidney Corp, Hammond—Yellow Transparent, Wealthy, McMahon White, Autumn Streaked, Kourks Anis, Brett's No. 2, Sylvan Sweet, Phillip's Seedling and Avesta.

Clarence Wedge, Albert Lea—Duchess, Charlamof, Anis, Briar's Sweet, Wealthy, Longfield, Hyslop and Transcendent.

Prof. S. B. Green, St. Anthony Park—Thaler.

F. W. Kimball, Austin—Duchess, Tetofsky, Wealthy, Early Strawberry, Transcendent, Hyslop and an unknown, grown by John Tracy of Oakland.

Jewell Nursery Co., Lake City—Early Strawberry, Duchess and sundry crabs.

Joshua Allyn, Red Wing—Early Strawberry and Duchess.

P. H. Perry, Excelsior—Lou, Florence, Wealthy, Martha, Excelsior, October and Longfield.

O. M. Lord, Minnesota City—Wealthy and Walbridge.

A. W. Latham, Excelsior—Briar's Sweet, Transcendent and Lieby.

S. D. Richardson, Winnebago City—Duchess, Wealthy, Early Strawberry, Whitney, Plumb's Cider, Beacher's Sweet, Transcendent, Haas, Wolf River, Malinda, Oligher's Seedlings Nos. 6, 8, 9, 10 and 12, Minnesota, Conical, Adams, Hyslop and Orange.

F. M. Crosby, Hastings—

Canada Greenings, raised by L. G. Hamilton, Hastings.

Wm. Mackintosh & Son, Langdon—Transcendent and Hyslop.

J. C. Walker, Rose Creek—Duchess, Duchess seedling and Whitney.

Wm. Sandrock, Money Creek—Several varieties.

C. Thielmann, Thielmantion—Wealthy, Duchess, Transcendent and Whitney.

E. C. Hazleton, Nichols—Early Strawberry and Transcendent.

John Hunter, Anoka—Several varieties of crabs.

B. C. Yancey, Edina Mills—Duchess, Wealthy, Whitney, Transcendent and Hyslop.

D. K. Michenor, Etna—Duchess, Malinda and several seedlings.

E. S. Bardwell, Excelsior—Wealthy, Duchess and Transcendent.

W. A. Carr, Excelsior—Wealthy.

Wm. Sarver, Excelsior—Duchess and Wealthy.

Z. D. Spaulding, Excelsior—Wealthy.

J. S. Parks, Pleasant Mounds—Five varieties of seedling crabs, Haas, Snow, Minnesota, Beacher's Sweet, Transcendent and Bradley.

O. Parker, Goodhue Co.—Duchess.

J. A. Howard, Hammond—Haas, Picketts, Hyslop, Longfield, Duchess, Wealthy, Whitney, Power's Red, Early Strawberry and several other varieties of crabs.

Edward Hyland, Rosemont—Duchess, Transcendent and Montreal Beauty.

J. G. Winkjer, Garfield—Transcendent.

Mrs. E. Cross, Sauk Rapids—Transcendent and three varieties of seedling crabs.

C. L. Blair, St. Charles—Duchess, Wealthy, Transcendent and Hyslop.

John Eklof, Cokato—Duchess, Transcendent and Hyslop.

F. M. Kilbourn, Lakeville—Peach, Hyslop, Wealthy, Whitney and a seedling.

S. D. Payne, Kasota—Duchess, Hyslop, Transcendent and two unknown varieties.

C. F. Brown, St. Peter—Transcendent.

C. Morgan, Forestville—St. Lawrence, Haas, Wealthy, Minnesota, Taylor's Seedling, Transcendent, Meader's Winter, Orange, Beacher's Sweet, Hyslop, Fameuse, Utter and Early Strawberry.

Mrs. I. Barton, Excelsior—Whitney.

John Turnbull, La Crescent—Fameuse, Hyslop, Transcendent and Golden Beauty.

H. J. Ludlow, Worthington—Several varieties of crabs, Daisy and Molly.

Andrew Peterson, Waconia—Wealthy, Patten's Greening, Antonovka, Green Sweeting, Lieby, Ostrekof Glass, Cross No. 5, Borovinka, Anisimonka and Blushed Colville.

Wm. Gerdson, Victoria—Gerdson's Seedling and Lieby.

R. H. Buttermore, Lake City—Wealthy and Whitney.

W. J. Sherman—A seedling crab.

J. Dunnewold, Duellm—Several varieties.

Peter Anderson, Waconia—A seedling.

Geo. R. Miller, Richland—Peerless and Excelsior.

Mrs. Welsh, La Crescent—Golden Russet.

Chas. Luedloff, Carver—Several varieties.

Ditus Day, Farmington—Duchess.

Dewain Cook, Windom—Wealthy, Hyslop, Whitney, Gen'l Grant, Small Red and Deans.

Wm. Somerville, Viola—Malinda.

R. C. Keel, Rochester—Giant Swaar, Rollin's Prolific, Red Black, Brett's No. 2, Wealthy and sundry crabs.

W. J. Thorman, Excelsior—A seedling crab.

C. F. Brown, St. Peter—Duchess, raised by Andrew Wilfer, Cleveland.

W. H. Jessup, Tracy—

Looking's Winter Sweet, Conical, Hyslop, Transcendent, Beacher's Sweet, Wealthy and Duchess, raised by W. W. Moses, Tracy.

Seven varieties of seedlings, raised by O. W. Walsh, Tracy.

L. E. Day, Farmington—

Duchess and Peach, grown by T. Tierney, Farmington.

Duchess, grown by B. Hoff, Farmington.

Duchess, grown by G. Schultz, Farmington.

Drake and Peach, grown by Ditus Day, Farmington.

Wealthy, Duchess, Mills' Seedling, Whitney, Briar's Sweet, Power's Red, Fameuse crab and Early Strawberry, grown by himself.

J. C. Kramer, La Crescent—Five varieties of seedlings—Transcendent crossed with Northern Spy.

John Stellar, Excelsior—Duchess.

W. L. Parker, Farmington—Duchess, Whitney and Early Strawberry.

Wm. Oxford, Freeburg—Duchess, Wealthy, Tetofsky, Haas, Dwarf Orange, Oxford's Orange, Fall Orange, Oxford's Winter, Utter, Anasim, Walbridge, Fameuse, Switzer, Golden Russet, Annstear, Golden Beauty, Oxford's Seedlings Nos. 1, 2 and 3, and Hyslop.

M. C. Bunnell, Newport—

Orange, grown by John Roling, Inver Grove.

Whitney, grown by Aug. Neubanes, Woodbury.

Whitney, grown by Ed. Korphage, Inver Grove.

Hyslop and Transcendent, grown by David Wentworth, Hastings.

Crab apples, grown by John Trast, Inver Grove.

Transcendent and Hyslop, grown by Jacob Bender, Inver Grove.

Seedling crab, grown by Geo. Harris, Denmark.

J. M. Doudna, Alexandria—

Four varieties of Russians, Wealthy, Duchess, Okabena, Transcendent and two varieties of crabs, raised by Peter Unneb, Holmes City.

Wealthy, Duchess, Tetofsky and four unnamed varieties, raised by A. P. Erickson, Alexandria.

Peter, Anis and Wealthy, raised by F. B. Van Bombach, Alexandria.

J. S. Harris, La Crescent—

Duchess, grown by J. Ready, La Crescent.

Duchess, Wealthy, Tetofsky, and Early Strawberry, grown by M. Becker, Dresbach.

A seedling, grown by F. J. Stoppel, Rochester.

McMahon White, Saxton, McLaren, Golden Russet and Golden Beauty, grown by himself.

H. M. Lyman, Excelsior—Duchess and a large number of seedling crabs and hybrids.

Total number of different named varieties exhibited, ninety-one, besides a large number of unnamed seedlings.

Cut Flowers.

F. G. Gould, Excelsior—Several shipments of hybrid perpetual roses during May.

Mrs. W. L. Parker, Farmington—Box of flowers, fifteen varieties of roses, etc.

J. M. Underwood, Lake City—A large number of shipments of a great variety of flowers during the months of June and July.

Joshua Allyn, Red Wing—Several varieties.

Sundries.

Prof. S. B. Green, St. Anthony Park—Success, Alpina and Chester Center Juneberries; berberries.

Fred Zuercher, Excelsior—Ferns.

Jewell Nursery Co., Lake City—Two cases of jars of sundry canned fruits.

Mrs. K. E. Savage, St. Paul—Several jars of canned vegetables.

S. & J. W. Koop, Brainerd—Blueberries, several shipments.

Joshua Allyn, Red Wing—Tomatoes, several shipments; peppers.

L. E. Day, Farmington—High bush cranberries.

Unknown—Cranberries.

I returned to Chicago from the second visit home on the 23th day of September, from which time I was with the exhibit until our booth was shipped to Minnesota, on the 6th of November. During this second absence from the exhibit my place was filled by Messrs. J. S. Harris, E. Nagel and F. G. Gould, each kindly giving about two weeks of his time to this work.

The press made some comments on the Minnesota exhibit during the late summer and fall months, some of which are worth preserving in connection with this report, and they are here reprinted:

(The Leaflet—a World's Fair Publication, July 1, 1893.)

"Minnesota struck the nail on the head when making her pavilion, and so arranging her fine assortment of fruits that they are shown to the best advantage."

(Minneapolis Tribune, August 2, 1893.)

"MINNESOTA'S HORTICULTURAL DISPLAY.

"Chicago, Aug. 2.—[Special.]—The Minnesota horticultural display is just now attracting a good deal of attention from visitors. The display from the North Star state of fruits and berries, such as strawberries, blackberries, raspberries, blueberries, currants, gooseberries, etc., is considered among the finest made here, notwithstanding the intense dryness of Minnesota weather this year, which greatly injured fruit in some localities. The largest and most successful contributor of fruit to the Minnesota display thus far has been Mr. Underwood, of Lake City, president of the State Horticultural Society."

(Minneapolis Journal.)

"NORTH STAR FRUITS.—THEY SURPRISE MANY VISITORS AT THE FAIR.—SOME FINE GRAPES AND APPLES.

"World's Fair Grounds, Sept. 13, 1893.—'I came to the World's Fair to see Minnesota's fruit exhibit,' said a well known citizen of Minneapolis the other day, and he was not a fruit raiser, either. The fact of the matter is that the pomological exhibit of the North Star state—so near the north pole, you know—is attracting as much attention as any fruit exhibit in the Horticultural Building. In grapes, apples and plums, particularly, Minnesota will carry off many awards when the official judging is completed. The Delaware, Duchess and Moore's Early varieties of grapes are Minnesota's best, and there are none better on the grounds. Beside them California's great, massive grapes are really not inviting."

(Mankato Free Press, September 22, 1893.)

"The fruit exhibit of Minnesota at the World's Fair is attracting wide attention and many are surprised that this state is able to make such an exhibit. The exhibit of grapes, apples and plums is especially fine."

(Northwestern Tourist, September 28, 1893.)

"Mr. Latham has gathered from various parts of the state samples of 50 varieties of grapes and 70 of apples, and has remodeled the display in Horticultural Hall so as to make these fruits the predominant feature. It is quite possible that Minnesota may do again what she did at New Orleans—get the sweepstakes and some other prizes, at least on grapes. Some other state may beat us on apples, for our crop has not been as good as usual, and we could not send so large a quantity as is shown on neighboring tables; but in flavor we can hold our own. It is a peculiar fact that Minnesota has given to this country two of its best varieties of apples. In a recent visit to Chicago we found grapes on a fruit stand bearing a card, 'Minnetonka grapes,' which shows that there are some Chicago people who want the best thing grown on earth, and their fruit dealers know where to get it."

(Mankato Free Press, September 29, 1893.)

"Of course all Minnesota people are proud of the position the state has taken in the great show. Some states may be a little more elaborate in their display, but the real resources and advantages are not better shown. There is something substantial about the Minnesota exhibit which must carry a lasting impression with all who see it. One of the greatest revelations as regards the resources of our state is its display of fruit. It does not, nor never has laid claims to being a fruit state, and yet in that great display of fruit our state exhibit makes a fine appearance. And so, in every other line, the display is not for mere appearance, but to give an idea of the advantages the state affords to those who are seeking homes and openings to invest capital, and this part is well done."

(Minneapolis Journal, October 6, 1893.)

"Minnesota awards in small fruit were announced a few days ago, but since then two more awards have been granted in the name of the state. One for the 1892 exhibit of miscellaneous fruit, the other for the 1893 raspberries. In this way 50 or 60 individual exhibits have been grouped. An award has also been given the state for the ingenious horticultural booth—an honor given no other state."

(*The Northwest Magazine, October, 1893.*)

"MINNESOTA'S HORTICULTURAL DISPLAY.

"Under the galleries of the great Hall of Horticulture, Minnesota makes a creditable appearance in comparison with her sister states. On one side her neighbor is Iowa and on the other Wisconsin, while in the near distance looms up the huge orange column of California. The Minnesota exhibit is arranged on shelves rising one above another against a wall. At each end is a revolving pyramidal display of grapes, surrounded with plants and worked by electric power. Here are shown about thirty varieties of table grapes, many of fine quality. Unfortunately they are not produced in sufficient quantities to come into our markets in competition with the grapes of New York and Ohio. That they should be raised at all in a region so far north is a circumstance that attracts a good deal of attention and inquiry. Of apples about fifty varieties have been shown since the early apples ripened. The specimens are not surpassed for size, perfection of form and beauty of color by anything shown by such great apple states as Michigan and Missouri. The Siberian crab grows to perfection in most parts of Minnesota, and many varieties are exhibited.

"Another fruit which gives the best results in our climate is the wild plum, that has been domesticated in certain localities as an orchard tree, but has not been much improved upon. In its wild state, growing along the margin of streams in the strips of natural woodland, it yields a fruit that is all the more appetizing because of its underlying savage flavor. Great quantities of these wild plums are every year sent to the markets of the Twin Cities. They make, with their different shades of peculiar red and reddish-yellow, a very handsome appearance.

(This notice was accompanied by the engraving which appears as a frontispiece to this number.)

(*Minneapolis Journal, Oct. 11, 1893.*)

"A POMOLOGICAL TRIUMPH—MINNESOTA SURPRISES THE WORLD
BY HER FRUIT SHOW.

"World's Fair Grounds, Oct. 11.—Competent judges have exhausted their pomological vocabularies in praise of Minnesota's fruit exhibit at the fair. For a state that has the reputation of being so cold, the showing of fine fruits made by Minnesota is indeed wonderful. The artistic eye, experience and good judgment of A. W. Latham, of Excelsior, Minn., the well-known Minnesota horticulturalist, who was put in charge of the exhibit early, have combined to make it one of the most attractive displays of fruit at the fair. With him the State Horticultural Society has generously co-operated.

"At the outset Mr. Latham designed a novel booth, which did much to enhance the showing of fruits. This was in the form of a little house with large glass cases in front, topped by shelves within the cases, the fruit being placed on the shelves. Back of the shelves were mirrors, tilted at such an angle as to reflect the fruit to the passers-by and thus magnify the display. At either corner were erected two revolving pyramidal stands laden with canned fruit and neatly decorated with vines. The stands are made to revolve by tiny motors inside the exhibit. The spacious interior of the booth Mr. Latham turned into an office and storehouse. Here also are his refrigerator chests, by means of which the glass cases of the exhibits are kept at such a temperature that the fruit is the better preserved.

"So simple and yet so sensible is the arrangement of the Minnesota booth that its design was almost exactly copied by Illinois, just across the isle.

"The first fruits displayed by Minnesota were apples of the 1892 crop. These gave way in their turn to the small fruits of the season, such as strawberries, raspberries, huckleberries, blackberries, etc. Some very tempting plates of these berries were placed on exhibition. These were in turn succeeded by plums, grapes and the apples of 1893. The last displays were, of course, the best, and the Minnesota grapes in particular made a very beautiful showing. A few peaches were also on exhibition.

"One hundred varieties of apples, seedlings and Siberian crabs were exhibited by Minnesota. Of these the Wealthy variety made the most striking showing.

"Of grapes, Minnesota's Concord and Delawares were admittedly the best of those varieties of any shown in the Horticultural building. Other very showy and attractive varieties contributed by Minnesota were the Worden, Moore's Early, Lady, Duchess, Lindley and Agawam. It has been no unusual thing for Minnesota to have 200 baskets of grapes in cold storage here waiting their turn to be placed on plates and shown to visitors. The plum family was also well represented, among the varieties shown being the Weaver, Cheney, Miner, Rollingstone, etc. These came from all over the state. The grapes were raised in the Minnetonka region, but the apples vied with the plums in being cosmopolitan contributions. The contributors, mostly members of the Minnesota Horticultural Society, may feel proud of their aid in making Minnesota's fruit display such a fine success."

(*St. Paul Globe, October 13, 1893.*)

"St. Paul Globe Bureau, World's Columbian Exposition, Minnesota Building, Jackson Park, Chicago, Oct., 12.—In horticulture Minnesota has one of the most interesting and beautiful exhibits on the grounds. In no other is the arrangement of the fruit and the general effect of the display as good. The exhibit is in charge of A. W. Latham. Every foot of space is utilized, and the fact that the booth is a complete refrigerator is not suspected by one out of a half hundred who stop to question and admire the fruit. As quick as the first sign of decay appears the specimen is removed and another takes its place. A mirror borrows

the exhibit of Illinois, in a sense, and makes it a part of this, as it is directly opposite. There are 140 varieties of Minnesota-grown fruit, including twenty-five varieties of apples, shown. The apples are hardy and are not only good keepers, but excel in color and flavor. Minnesota is not a peach growing state, yet excellent Minnesota-grown peaches are also shown. The grapes and plums are especially fine, and in small berries the fruit interests of the state appear to splendid advantage. The currants, gooseberries and strawberries are as nice as it is possible for them to grow in any locality, and they are superior to those grown in some localities making greater pretensions in the way of fruit growing."

(A large cut accompanied this notice.)

(*Mankato Free Press, November 3, 1893.*)

"In the matter of fruit the position which Minnesota took at the Fair was a source of surprise to everybody outside of the state and many within. In the East especially Minnesota has been held in mind as a wild, bleak prairie waste, where nothing but No. 1 hard wheat would grow. The Minnesota fruit booth at the Fair dispelled this delusion and broadened their ideas as to the possibilities of the state in this direction."

The photo-engravings accompanying this report were taken on Minnesota Day, October 13, 1893. They differ from others in having the glass covers of the refrigerator cases raised, as it was found that in a photograph the fruit did not show well through the glass.

The brief directions sent out for packing and shipping fruit may be of value to preserve, as they are the result of considerable experience. They are here given:

DIRECTIONS FOR PICKING AND PACKING FRUIT FOR SHIPMENT TO THE MINNESOTA HORTICULTURAL EXHIBIT AT THE WORLD'S FAIR.

GATHERING THE FRUIT.—Fruit of all kinds should be gathered after it has reached its full size and color and just before it has reached a condition of perfect maturity. It will not carry or keep well if *fully ripe*.

In gathering be very careful not to inflict the least pressure or bruise on the fruit with the fingers or by contact with any object.

KIND OF PACKAGES.—Berries of all kinds should be packed in pint boxes in berry crates.

Plums would come well in quart berry boxes.

Apples may be packed in any box or barrel.

Grapes should be packed in 10 lb. tight grape baskets.

PACKING MATERIAL.—Cotton wadding, the kind that comes in sheets, has proved to be the best material for protecting fruits from injury on the way.

Do not use the common cotton batting, as it sticks to the fruit.

MANNER OF PACKING.—In packing berries, put a layer of cotton in the bottom of each box, then put in a layer of fruit, then another layer of cotton, and so on to fill the box, and lastly a layer of cotton. Fill the case with the boxes packed in this way.

Plums may be packed in quart boxes in the same manner as berries, except in the case of a choice variety, when it might be well to wrap each plum separately in cotton.

Apples should be packed in *very closely*, first wrapping each specimen carefully in the cotton wadding.

In packing grapes each bunch should be wrapped carefully in the cotton wadding, and the basket filled as closely as possible without undue pressure.

SHIPPING DIRECTIONS.—Ship at once by express—American, when practicable. Put one of each of the two kinds of shipping tags sent you on the top and end of the box, and be sure that your address is also on the box and a list of its contents.

Write giving the date of shipment and describing the contents of the package sent, and state whether you wish them entered for a *premium*.

LABELING THE FRUIT.—Be sure that every article sent is properly labeled. This is *very important*.

QUANTITY AND QUALITY OF FRUIT TO SEND.—*As to quantity*, send not less of any one variety than a pint of small fruits, plums, etc., five specimens of apples or five bunches of grapes.

Send, however, an extra amount of anything that is showy and handsome, as it is the display of such fruit that makes the exhibit attractive.

As to quality, as far as you can, send only large, high-colored and fine speci-

mens, and even when making up an assortment do not put in anything that is positively inferior or below the average.

The fair closed on the 30th day of October. The commission having donated the structure and its contents to this society and appropriated \$150 to pay the expense of removing it to the state fair grounds, the structure was taken down in sections and shipped home on the 6th of November. I returned to Minnesota the same night, glad enough to breathe again the wholesome air of the great North Star state. The structure has been rebuilt in the agricultural buildings at the state fair grounds and will remain, with its equipment, including the motor, furniture, etc., a permanent possession of our society.

This, in brief, is the record of our exhibit at the World's Fair. There are many things yet which should be said in regard to it, or more especially in regard to those who aided it by their encouraging words and acts. Six months is a long time to maintain a fruit exhibit, and it is hardly possible that there should not be some friction in the working of a machine so hastily planned as the greatest of world's fairs. Any little unpleasantness attendant upon this work has left no permanent impression, but, instead, there are only pleasant recollections of the uniformly kind and appreciative words of the officers and members of this society, the superintendent of the state exhibit, Mr. L. P. Hunt, and the Minnesota Board of World's Fair Managers. It is a pleasure to me to record that, in no instance have I heard or read of an uncomplimentary or unappreciative word in connection with this exhibit. Many of these kindly words are on paper and have come to me, directly or indirectly. I do not feel at liberty to reproduce these expressions here, as in the main they are of too personal a nature, but I may, with pardonable pride, make two or three quotations: Mr. J. S. Harris, our oldest member, writes to a third party under date of June 19, in a letter which I am sure he does not know is in my possession, as follows: "I was well pleased with our Minnesota exhibit of fruit, and I think that it attracts its full share of attention. Every Minnesotan is proud of it." Our friend, Secretary J. O. Barrett, says: "It is due to truth to say that the Minnesota exhibit bears the palm in construction, order and neatness, and is well relieved by a tasty arrangement of vines and flowers." Prof. L. H. Bailey, of New York Experiment Station, says: "I am greatly pleased with the display made by Minnesota."

Special mention should of right be made of the valuable assistance rendered by President J. M. Underwood. Besides the large amount he furnished, under the name of the Jewell Nursery Co., during the months of June and July he sent flowers in great variety, two or three times a week, in sufficient quantities to adorn the exhibit. Mr. Gould, also, sent in May some very beautiful hybrid perpetual roses from the only greenhouse of the kind, so far as I know, in the state. Flowers were also contributed by Mrs. W. L. Parker, of Farmington, and the late Mr. Joshua Allyn, of Red Wing.

The resume of our awards is as follows:

- (1). On apples, crop of 1892.

(2). On the structure. (This award was the only one of the kind in the horticultural department, and a special class was created on account of it).

(3). On raspberries, crop of 1893.

(4). On plums, crop of 1893.

(5). On grapes, crop of 1893.

(6). On apples, crop of 1893.

Only two awards were made to individuals, both on plums; namely, to Mr. Dewain Cook of Windom and Mr. O. M. Lord of Minnesota City. A great many others were deserving of notice, but the practice of the department previously referred to barred them.

A large proportion of the contributors asked for no compensation, and only in the case of those who shipped large quantities was any payment made. The prices asked were uniformly reasonable and often below the actual value to the grower. In so far as our exhibit was a success the credit is certainly due largely to the members of this society, and, in closing, I wish to acknowledge in the most earnest manner the hearty and ungrudging support tendered me, without exception, by its officers and members. President Underwood gave much time and thought to this work; the executive committee held several meetings in connection therewith, and, in ways innumerable, the chairman of the board, Mr. Wyman Elliot, aided by his counsel and encouragement in its prosecution.

DISCUSSION.

(Following the reading of above report.)

Remarks by C. McC. Reeve, Secretary of the Minnesota Board of World's Fair Managers.

MR. PRESIDENT, LADIES AND GENTLEMEN: I do not know that anything I can say in regard to the work accomplished at the World's Fair in the horticultural department of the state of Minnesota will give you any better idea than you have received from the very full and, I must say, altogether too modest report of your secretary, to which we have just had the pleasure of listening. But I can say this, which he apparently was unwilling to say, that from the time the first steps were taken here in the state to prepare this exhibit up to the time when the last case of goods was packed and shipped out of Chicago, Minnesota did not do anything in the same way that any other state had done or presumed to do. In the first place, without complaining as to the amount of money which you were to receive from the state commission, your executive committee went ahead and pursued the line of work that had been authorized, and asked us to throw out such suggestions as we wished to make in regard to this exhibit. Of course, this was very complimentary to us, and when Mr. Underwood and your secretary came to our office and said, "We think we had better make this exhibit in something like this manner," and it was left for us to say what they should do, I did not have any clear idea of the plan they proposed, but I was satisfied it was all right; and when I was called upon to report what was being done, I said their work was all right. I had

the utmost confidence in these gentlemen, that they knew what they were going to do. When they found they were not going to receive the amount of money they were entitled to, they said, "We are much obliged for what we have got."

Those of you who were in Chicago will remember how in that enormous hall along one side were placed the designs of the different states. Here there were long tables loaded with the products of California, Oregon, New York and other states, and here by itself was this unique booth which was evolved and prepared by the brains of some of your members. What was the result? Although the other states had prepared their exhibits, the first thing Illinois did, the state having the largest appropriation of any state that was represented there, they came over and stole away our design. When they got it done, everybody knew it was only a sort of imitation. Right opposite our exhibit they put a table and piled it up high as they could reach, making graded steps with fruit, which, of course, was done to detract from the exhibit of fruits in our booth on the side. It was calculated to and did detract greatly from the effects of our exhibit, and it was done in direct violation of agreement.

I heard a great deal told about the Minnesota exhibit of fruit, and as the members of this society are recognized as people who generally tell the truth, and as people whose word and whose statements could be relied on, when you got down to Chicago and was standing, as I often was, around this exhibit, and people would come up and inquire if this was the Minnesota exhibit, and where did this fruit come from, I would tell them it came from Minnesota. "Yes, but where did they get it before it got into Minnesota?" "Well, my dear sir, this fruit was grown in Minnesota—every bit of it was grown in Minnesota; it is all our native production." One gentleman looked me over from head to foot, and he says, "Young man, do you mean to tell me that a state where they have ten months winter and two months very late in the fall, raises such apples as these?" "I mean to tell you that very same thing," I replied. There were many comments made on our exhibit and surprises expressed that such fruit could be raised in Minnesota, and while many people were more impressed with the population of our state, they also realized that we could raise fruit from our interesting exhibit there. I do not wish to take your time. I merely want to say this, in conclusion, that the exhibit was one of which the state was proud and of which the commission was proud, and it was one of which the National Commission was proud, for more than one member of the National Commission told me that among all the exhibits of horticultural products of the various states, the exhibit of Minnesota was one of the best exhibits there was in the horticultural building. Now, my friends, our work at the Chicago Exposition is past. The temporary notoriety that came to a few of us will soon be merely a memory, but the work here that you have to do, the work that this society has to do, and the work that this society has done in the past, will go on from year to year and make itself felt, not only as it has been felt in this exposition, but making itself felt as the years go by. I thank you, gentlemen, for your kind attention. (Applause.)

Mr. E. H. S. Dartt: I want to say that I was down around Chicago for awhile, and I watched the motion of things in that great hall with those long tables of fruit. I watched the crowd that passed along those alleys, and the only place they stopped was in front of the Minnesota exhibit.

Mr. Barrett: I move a vote of thanks be extended to Col. Reeve for his able and interesting remarks. (The motion was carried).

Pres. Underwood: I wish to say just a word with regard to Mr. Latham's part in this exhibit, and particularly with regard to the design of the booth. Mr. Latham is altogether too modest a man, and he works in a quiet way. Still waters are usually deep. I do not know of any one to whom more is due for the work performed there than is due Mr. Latham, and I think it is something we want all to understand. In his report, which I admired very much, there is that same spirit which always characterizes me in a horse trade. A horseman once told me I never could trade horses, because I was always talking about the defects in my horse, and that is the trouble with the secretary's report—he does not say anything of the defects or drawbacks under which he had to labor. There is so much that was good and grand to speak of that it is not necessary to talk about the little difficulties that we were under at times.

THE DISCOURAGEMENTS OF THE YEAR.

MRS. A. A. KENNEDY, HUTCHINSON.

The discouragements of the year have been many. Poor crops and hard times have been the cry. Perhaps, we horticulturists felt it as keenly as any one class, because we wanted to do something grand at the World's Fair. I, for one, wanted to hand my name down to the coming generation by furnishing some cans of fruit that would make the mouths of those from more favored climes water on account of the size and delicious flavor of my fruit. But alas, alas, when I fain would have gathered from my garden something that would astonish the nations!

I found nothing in the strawberry line but a few little, hard nubbed things not fit to be called strawberries. I gathered enough, such as they were, to make three shortcakes (and they were shortcakes, too). And then my raspberries were so inferior in size that I had no desire to see how they would look after they were canned. So I did not can any.

I received a letter from our secretary saying, "Cannot you send me some fruit? There must be some somewhere that will do to place on exhibit." I read it over and over, then said, "Well, it isn't

to be found in my garden, but if there is a place in this region, I will find it." So I started out in quest of something nice in this line of fruit. I visited farm after farm, but found nothing better than I had at home. I made up my mind that for once Mr. Latham was mistaken, and I came home with something of the same feeling the man experienced when his field of buckwheat had been killed by the frost. After visiting adjoining farms and finding others were in the same boat, he came home and said to his wife, "It isn't so bad after all, the neighbors have lost theirs, too."

Some said, "Mrs. Kennedy, I am discouraged. I don't believe we are going to make a success raising fruit. Let us go to Florida or Sunnyside where we know we can raise fruit." I said, "What fun would it be, or what thanks would we have if we did just what every one else could do?" I, for one, would like to do something that every one can't do. The harder the nut, the sweeter the kernel. And today I am not discouraged. I believe with such leaders as our president, secretary, Prof. Green, Messrs. Harris, Brand, and Dartt, and a score of others I might mention, we shall yet be able to sit under our vine and fig tree and eat fruit to our fill.

POMOLOGY AT THE WORLD'S FAIR.

J. S. HARRIS, LA CRESCENT.

The World's Fair was by far the greatest of its kind the world has ever seen. It was a success, made so by the American people, and they have shown to the whole world their capabilities. Never before in the history of the world has any nation arisen in its might, used such indefatigable energy in such laudable methods to show honor to the great ones and made it such a grand success. The whole country, yes, and the whole world, will be benefited by the inspiration of higher ideals in education, art, literature, agriculture, manufactures, commerce, etc., and we do believe it has revived and strengthened the patriotism of our people and made them to realize the advancement of this great country in the four hundred years since one of the islands off the coast was discovered by the intrepid mariner, Christopher Columbus, thus opening for the habitation of civilized man a new world. All that is great and grand in human works on this continent has been created in that time, and we are just beginning to realize our capabilities, and the benign influences will be felt long after this generation has faded away and turned into dust.

But I think the greatest and most lasting benefits to the American people will follow from the wonderful exhibitions in pomology and horticulture. Millions of our people saw, admired and studied the great and grand collection of fruits, such as no occasion had ever before brought together—fruits from the cold North, where the winters are long and rigorous, and from the sunny South, where the balmy breezes forever blow; fruits of every kind that are used for food, luxury, or that enrich commerce—everything that is beautiful to the eye or pleasing to the taste, from the little red berry that

grows upon the creeping vine in the most inclement regions, up through the fruits of shrubs and trees of the temperate zone, to the citrus, pomegranate and palm fruits of the tropics—all were there in the greatest profusion. Fruits

"From the proud trees whose heads the sky assails
To the lowly vine that loves the dales."

When the Beneficent first chose a scene to occupy and develop the moral and intellectual faculties of man and give him the most perfect enjoyment, he placed him in the garden of Eden. Refreshing bowers and luxuriant verdure, a pure crystal stream, sweet fragrance and all manner of delicious fruits were the scenes of man's first blessedness. The crowning glory of the World's Columbian Exposition was the reproduction of the first Eden, and we predict that it will be the beginning of a new and better era in the condition of the human race; that thousands who beheld the wonderful sights and drank in the sylvan scenes have been inspired of the amiable genius of Horticulture, and returned to their homes determined to improve and fashion them after the patterns of the lovely scenes they beheld at the fair, and plant and raise more and better fruit. Your verdict may be that we are a little visionary in the matter of pomology. Please do not render it until we have finished our plea, and give us the benefit of all extenuating circumstances.

Our first, longest and strongest love has been horticulture. From our earliest infancy, down through the years of our life (now almost three score years and ten), pomology has been our most fascinating study. For more than forty years we have pursued it with diligence in the new Northwest, and that, too, under the greatest of difficulties, and we have thought that we enjoyed it most where the obstacles seemed most insurmountable. When the clouds were the thickest and skies darkest, we saw bright gleams of hope beyond. Had that not been so, after such a calamity as overtook us in 1872-3, when everything we had built upon proved like a foundation of sand and the work of twenty years vanished—not in the smoke of fire, but went up in the most terrible blizzard that ever swept over this region—we should have turned our back upon Minnesota, shaken the dust from our feet and journeyed to some more favored region where others had demonstrated that fruit could be grown with certainty and with less labor. Those notions of ours that a pomology could be created that would just fit Minnesota may have been a little cranky.

It was our privilege to visit the fair in June, August and October, and spend in all about thirty-five days. It was the one opportunity of our life to see, examine, handle, taste and compare the fruits of North America and some other parts of the world, and make the acquaintance of the leading pomological spirits of this and other lands. There were probably 2,000 varieties of apples shown, varying in size from the Siberian crab, up to the mammoth pippins of nearly two pounds weight; and of every conceivable marking, from palest green and yellow, through russet and almost inconceivable marking of stripes and splashes of blush, pink and scarlet, to the darkest purple reds; and ranging through the forms of oblate, ovate, round,

conical and oblique. The study of 400 or 500 of them, with which I have been more or less familiar, noting their variations in size, intensity of color and quality, as they have been raised in widely different localities, was truly interesting. After enjoying such opportunities, and seeing the variations and effects of soil and climate upon fruits, we are more cranky than ever, for we now boldly assert that there is a pomological future for this region, and that it will be hastened as one of the results of the World's Columbian Exposition.

Our first day at the fair, and, in fact, the first week, was unsatisfactory, and we were bewildered at the thought of having to see so much in the limited time of ten or twelve days. On the first day we took a hasty survey of the fruit exhibits, and then made our plans for seeing the most in the shortest period of time; but soon cast them aside, resolving to see the most of that which gave us the greatest enjoyment and promised the most lasting good. The result was that we spent a considerable portion of every day among the fruit tables in the Horticultural Building. At our first visit, only such fruits of the temperate region could be seen in their natural state as had great keeping qualities, or could be preserved in cold storage, while the perishable fruits were shown in solution and exhibited in glass jars. The artistic effect was grand, but half the life lesson was lost. At this early date California, and Florida had the advantage over all the other states in being able to make great and gorgeous displays of the citrus and other tropical fruits, and the first conviction of nearly all visitors was that theirs were the greatest and grandest of fruits in the exposition. But with the multitudes having pomological tastes that conviction gradually wore away as they saw, in such profusion, the fruits of other regions in all their varying aspects, as produced under differing environments of soil and climate, and all enquiring minds at once found opened before them a broad field for study and investigation.

At this date the exhibits of some of the states were very incomplete, but continued to grow in magnitude, beauty and interest until near the close of the fair. One of the interesting curiosities at this time was two shipments of apples from New South Wales, picked from the trees just at the time when the trees were in full bloom in our best apple districts. Both were picked and started on the same day; one came by way of San Francisco and was forty five days in transit; the other by way of Liverpool and New York and was about sixty days in making the trip. They arrived in fine condition. Only about twenty per cent. were of the familiar varieties grown in our older apple regions, and of these the environment of soil and climate had so greatly changed the appearance that it was difficult for experts to identify them without cutting and tasting. The quality of their fruits proved good and we may find a competition in that far-off region that will take the profits off the cold storage stock of Ben Davis and Willows that fill the gap in our summer trade from May until August, by crowding them out with fresher far-fetched stock.

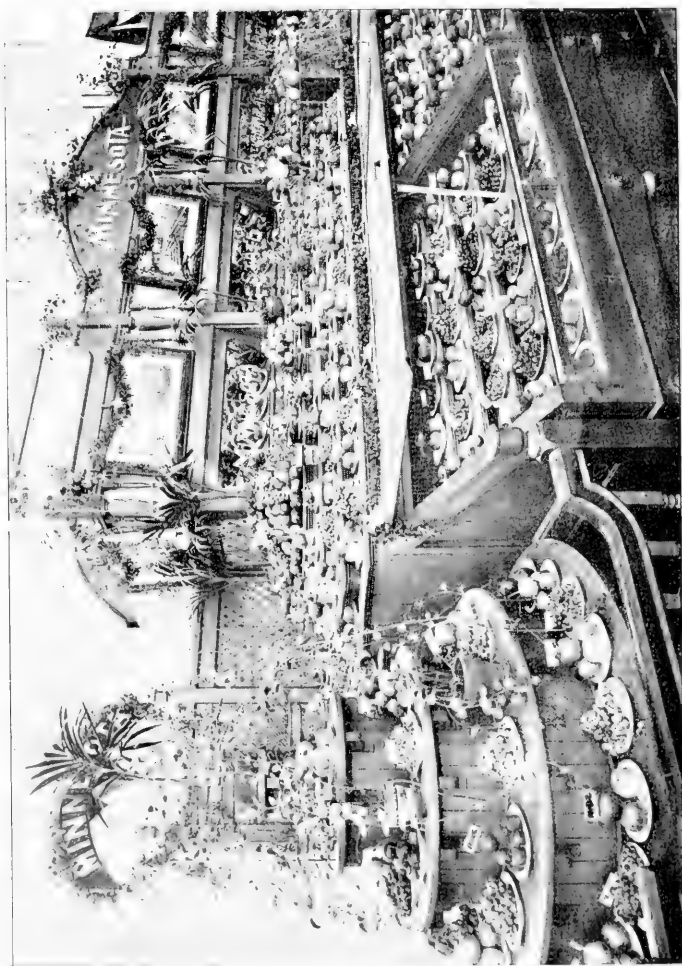
There was almost as great a difference observable in the appearance of varieties grown in the different fruit regions of this country. In some regions the shades of reds run into browns and deep crim-

sons, and in others clear, bright scarlets. The yellows, greens and russets differed greatly in the different localities, running and blending into each other. The environment of soil and climate had also a similar effect on the size and form of the varieties. The Baldwin, King and Twenty Ounce of the North Pacific coast and in the Rocky Mountain regions could hardly be recognized as the same varieties so well known in Michigan, New York and New England. And our own Wealthy changes its form and assumes gigantic proportions in Colorado and Washington. A plate of them in Colorado exhibit were of the size of our Wolf River and Alexander, but they were the Wealthys still, although no better or more beautiful. In many cases these differences led to warm discussions in deciding upon the correct nomenclature. In the exhibits of Maine, New Hampshire and Nova Scotia, dark red colors predominated. In New York and Ontario the colors were more varied, the reds not being as deep. Kentucky showed more yellow and green. But it was left to Wisconsin and Minnesota to present the clearest hues and finest blendings, as well as the most symmetrical forms.

As the season advanced, the beauty and interesting features of the exposition increased. Small fruits began to arrive from points farther north, and before the first ripe strawberries were gone, cherries, plums, peaches and new apples and pears began to appear in some of the exhibits; and at the same time there was set up a fine collection of grapes from Texas. Taking the whole season through, the greatest variety of fruits from over the largest extent of country was probably shown in August. At that time the cherries were not all gone, and plums, peaches, grapes, pears and the earlier varieties of the new crop of apples came in freely, and the changes wrought in the appearance of the tables from day to day was marvelous. Many of the jars were removed, and the cold storage fruit was cleared off, and its place quickly filled with the new fruit of 1893.

On the first of September, Wisconsin had the most attractive exhibit of apples in the building, Arkansas the largest and Iowa bidding fair to get ahead of all competition, while Illinois, Oregon and New Jersey appeared to be ahead in general variety. Later in September and the beginning of October, the features of the exposition that were most valuable and interesting to Minnesotians and their near neighbors appeared, and it was our happy privilege to put in ten most enjoyable days among the fruit tables and in pleasant associations with numbers of the most noted pomologists of the world. We shall always remember with pleasure the courtesies shown us by Chief Samuels and his assistants, and the hearty permits to do as we pleased from the superintendents of the various state exhibits and the facilities they offered to aid us in our studying. Our only regret was that we could remain there no longer.

We have mislaid a portion of the notes taken while there, but in order to convey to those who were not privileged to visit the fair some idea of the vastness of the fruit show from the Middle and Northern states and Canada in this year of poor and short crops almost everywhere, we will append brief reports of the exhibits as they were from the middle of August until the close of the exposition.



MINNESOTA FRUIT EXHIBIT AT THE WORLD'S FAIR.
Partial view at north end. Taken October 13, 1893.

Arkansas had upon her tables 1,500 plates of fruit, besides some massed displays of sample varieties. Of standard named varieties, there were about 250, and of seedling and unknown varieties of apples, 61; of pears, 16; of peaches, 30; of native grapes, 18. In average size, perfect form, general appearance and quality, together with the number of varieties, the apple exhibit of this state excelled that of all others.

Colorado had a spread of 1,000 plates. In the exhibit there were 130 varieties of apples, 32 of pears, 20 of plums and 15 of grapes, besides a large and beautiful display of fruit in solution. In this exhibit the apples were most beautifully colored, and some of the Wealthys had reached the enormous size of four inches in diameter and were more elongated in form than those that grow here.

Our notes on California are missing. According to our recollection her plates of the northern fruits numbered about 800, with about 15 varieties of apple and a fine assortment of pears, peaches, prunes, apricots, plums, grapes, etc. In the exhibition of citrus and tropical fruits her display was beyond description.

The Idaho exhibit occupied about 500 plates. There were 60 varieties of fine, well-grown apples, 16 of pears, including the new variety, Idaho, of which the specimens were large and beautiful, 15 of peaches, 10 of plums, 6 of prunes and 10 of grapes.

The Illinois exhibit was a very large one, covering a space of over 3,000 plates. One thousand of these plates were used for apples, of which there were 100 varieties. One hundred and twenty-five varieties of grapes were shown on 800 plates, while pears, peaches, plums and other fruits were shown in great profusion, showing that this is a state of wonderful resources.

Perhaps, in no one state besides California was such indefatigable energy displayed to make an exhibit that would be an honor to the state as in Iowa. The apple crop of 1892 had been very short in that state, and before the new fruit began to come in they were laboring under great disadvantages. When the exhibit was all up it covered a space of nearly 3,500 plates, in which they claimed 402 varieties of apples, 25 of pears, 10 of peaches, 59 of plums and 69 of grapes. Among the plums were a number of the Japanese varieties, which promise well in that state and to be useful for crossing with some of our best natives, giving them the inherent qualities they lack to make them popular commercial fruits.

In the Kansas exhibit there were 800 plates of apples of 76 varieties. There were also 22 varieties of pears and 82 of grapes.

The space occupied by Kentucky was covered by 800 plates. There were 150 varieties of apples, 24 of pears, 3 of quinces, 31 of peaches, 16 of plums, 35 of grapes, besides a fine display of persimmons, walnuts, chestnuts and hazelnuts. The fruit of this exhibit was uniformly well grown and nicely displayed.

The exhibit of Maine was not a large one. It consisted of 40 varieties of apples and 6 of pears, covering about 300 plates. The exhibit was noticeable for the preponderance of the sturdy red coloring of the apples.

In the Michigan exhibit there were 1,800 plates. There were 50 varieties of apples, 50 of pears, 20 of peaches, 15 of plums and 125 of grapes.

Minnesota showed, when at the fullest, 800 plates of fruit, besides that which had been put up in solution and was shown in jars. Of apples and Siberians, there were 125 or more varieties. Of peaches, there were 4 varieties, of native plums, 45 and of grapes, 55 varieties. Minnesota has no cause for being ashamed of her pomological exhibit, although the fruit was not up to her usual standard of excellence, and fully one-half of the varieties that have been shown at our home fairs were not there. Her fruit had that bright, fresh appearance which is characteristic of all the products of this Northwest, (even to the fair maidens), and there were artistic features about the arrangement of the display that caught the eye of the thousands who daily passed through the hall, causing them to come nearer and examine closer. From the many favorable comments we overheard we think most people were much surprised to see so great a development of the fruits of this state.

Missouri occupied a space covered by 1,000 plates. Of apples there were 90 varieties, of pears, 35, peaches, 70, plums, 15 and of grapes, 100.

Montana made a modest showing of 250 plates of apples, comprising 20 varieties. Nebraska had a show of 1,100 plates, made up of 50 varieties of apples, 7 of peaches and 4 of grapes. New Hampshire showed but 160 plates, having 35 varieties of apples and 3 of pears. The fruit presented the same general characteristics as that from Maine. New Mexico had a spread of 300 plates, showing 40 varieties of apples, 10 of pears and a few elegant quinces. New Jersey had a show of 700 plates, in which were 50 varieties of apples, 50 of pears, 12 of peaches, a large and fine collection of grapes, quinces, cranberries and chestnuts.

It was expected that New York would lead every other state in the actual numbers of the old and new of the standard varieties of fruits. Within her borders the commercial nursery business had its beginning, and for a long time her enterprising nurserymen raised the bulk of the trees that were used in several states for planting orchards. She did not disappoint our expectations. Her fruits filled over 3,000 plates. She had on exhibition 1,100 plates of apples in 300 varieties; 500 plates of pears in 150 varieties; 30 varieties of peaches, 50 of plums and 1,100 plates of grapes in 105 varieties. She carried off the palm for having the largest cluster of grapes shown at the exposition. The bunch weighed nine and one-half pounds.

The Oregon exhibit was one of the most attractive at the fair. Her fruits were of the largest size, most perfectly developed and of superior quality for such large fruit. In this exhibit we found altogether about 800 plates. There were about 100 varieties of apples, 21 of pears, 7 of peaches, 10 of plums, 20 of grapes and several cherries, besides 400 jars of fruit shown in solution.

South Dakota had a very interesting exhibit of 100 plates, including 25 varieties of apples and crabs. The exhibit of Washington was a great surprise. In this we saw many of the varieties that we raise

in Minnesota, but the climate and soil had so changed their appearance that we could scarcely recognize them. Some varieties were of monstrous size. The spread was 500 plates. There were 45 varieties of apples, 18 of pears, 10 of peaches and 6 of plums. We were informed that the fruit was grown in one orchard.

West Virginia had a creditable exhibit that we came very near ascribing to some other state. It consisted of 12 varieties of apples and 1 of pears, and numbered 85 plates.

And now, last but not least, comes our near neighbor, Wisconsin. Not a single other exhibit from any state showed to better advantage. No extra pains had been taken for artistic effect and there was nothing in the way to detract from the fruit or hide defects, and for so large an exhibit it afforded one of the best opportunities for study, observation and comparison of any exhibit in the building. It occupied 1,000 plates, on which were shown 120 varieties of apples, 6 of pears, 10 of plums, 55 of grapes and 4 of cranberries. Besides these there was an exhibit from Sauk county by Fox, Tuttle and others, consisting of 350 plates, on which were shown over 50 varieties of apples, mostly of Russian origin, and 55 of grapes. The apples were generally clear and delicate in their coloring, smooth and regular in form and attracted much attention.

We will conclude with the Canadian exhibit. This was indeed a great surprise to the majority of visitors. We most heartily congratulate our Northern neighbors on the magnitude of the exhibit, its tasty and instructive arrangement, the superior quality and great variety of their fruits and their good fortune in having such affable gentlemen in charge of it. About 5,000 plates were used in making the display, beside several hundred jars of the fruit crop of 1892 in solution. The largest exhibit was from the province of Ontario. It contained 100 varieties of apples, 67 of pears, 42 of peaches, 75 of plums and 79 of grapes. Quebec had 119 varieties of apples, 2 of pears and 7 of grapes. Nova Scotia had 144 varieties of apples, 23 of pears, 10 of plums. British Columbia had 51 varieties of apples and 17 of plums. The experimental farm at Ottawa showed 133 varieties of grapes. The show of fruit on the plates from the middle of August to the close of the exposition averaged about 30,000. As this had to be renewed as often as every ten days, it required the enormous quantity of about 200,000 plates to keep up the fall exhibits, besides the quantities used in making the designs and decorating and allowances for damage and decay in transportation.

The officers of the department, the superintendents of exhibits and others saw in this exposition an opportunity for broadening the field of pomology, and bringing its leading spirits into closer and more friendly relations. To effect this a society was organized and named the Columbian Horticultural Society. Weekly meetings were held, at which timely papers were read by a number of the master spirits of horticulture in this and other countries. The interesting and knotty questions that continually arose were very thoroughly considered. In June, the American Nurserymen's Association held their annual meeting within the fair grounds. In August, a World's Horticultural Congress was held under the aus-

pices of the fair. This called together a considerable number of nurserymen and pomologists from many countries, and doubtless its influence for good will be great and lasting. The sessions of each branch were held in different sections, which proved to be much better than a promiscuous mass convention. It facilitates business and gives each delegate and visitor an opportunity to spend his whole time with that section in which he is most interested, or in which he sees the opportunity of gaining the most good. An outgrowth of this congress was the organization of a World's Horticultural Society. It is an association of national, state, provincial and district societies of every branch of horticulture, and individuals of every horticultural pursuit who desire to join. In this organization, besides our own country, England, France, Germany, Russia, Japan, Mexico and Canada were represented.

Your humble servant most sincerely believes that pomology was the best feature of the greatest fair the world ever saw; that it will give a new impetus to progressive horticulture, and prove the beginning of a new and better era in the history of pomology. Pomology has made wonderful progress within the time since our society was organized. Who can tell what the future progress will be until the fruits of the impetus for research and experiment inspired by the great fair are all gathered in?

Your Corner.

IRRIGATION.

DEAR SIR: No. 7 of the "Horticulturist" received and the contents relished as usual.

I see you call for experience in the way of irrigating small fruit. I have done a little in that line in my blackberries this season and am very much pleased with the result and intend to put in a plant of some kind next season to irrigate all I can.

This season I used a team and tank and irrigated one piece of sixty-five rods. I commenced July 12th and hauled eight tanks of twenty barrels each, making 160 barrels. July 13th, I hauled five tanks of twenty barrels each, making 100 barrels. July 14th, I hauled five tanks of twenty barrels each, making 100 barrels. This gave it a pretty good soaking. On the 18th, I gave it eleven tanks more, making 580 barrels in all. On the evening of the 19th, we had a pretty good rain which did for a week. I intended to haul again on the 29th, but other work prevented.

From this experiment I conclude that we must have a very large storage tank or cistern, as it will take fifty barrels to the rod to do it well. My intention at present is to put up a windmill and build a large shallow cistern (partly in the ground and open on top, so the sun will warm the water) on the highest part of my berry field,

which will enable me to reach nearly all of the plot by the natural slope of land.

I hope to see this subject fully discussed in the "Horticulturist", as we must have water when needed, to make fruit raising a success. With best wishes for the "Horticulturist" I remain, yours truly,

W. S. WIDMOYER.

Dresbach, Minnesota, August 15, 1894.

A SWINDLE EXPOSED—THE "MODEL ORCHARD" SCHEME.

AUGUST 22, 1894.

DEAR SIR: Knowing that your society always stands ready to expose fraud wherever found, we take the liberty of calling your attention to a swindling scheme being worked by tree agents upon farmers in southern Minnesota and northern Iowa. It is not a new one by any means, but the manner in which this gang carry on their work is damaging, not only to their victims, but to the horticultural interests of the state, and to those who have for years labored honestly to put the Northwest to the front as a fruit growing section. We refer to the "model orchard" scheme.

These agents claim to represent some Princeton, Illinois, nursery, but we are informed, as a matter of fact, the only relation between them and that nursery is that they buy their stock of the above company, and re-model varieties to suit themselves. They have operated in the above named territory quite extensively for the past two years, and the outcome of their swindling methods will result in great damage to the fruit growing interests of this and adjoining states. Not satisfied with the ordinary methods of pushing their scheme, they pull down the work and reputation of nurserymen who are doing their best to put into the hands of planters of the Northwest something that will give them value received for their time and money, and what long experience has taught them to be worthy of propagation.

Their scheme is about as follows: They approach a farmer with a proposition to furnish him with from \$75.00 to \$80.00 worth of nursery stock, or enough to set out a certain area, agreeing to plant and care for the orchard for a certain number of years, giving the farmer time in which to pay for it, with the exception of one-third of the amount, which is to be in cash, the balance in negotiable paper, payable in one and two years respectively. These notes are immediately sold to an innocent purchaser, and the farmer will have to pay them whether the contract is carried out or not. They have not the least idea of fulfilling their part of the agreement and, being totally irresponsible, cannot be compelled to do so.

Should the farmer have an orchard on his place, he is informed that he has been duped, and that the trees are perfectly worthless, as they are "root-grafted;" and to prove it the operator pulls up a young tree, cuts it off at the union of the stock and scion, and shows the farmer the scar in the tree, informing him that "the only thing to do is to dig up this orchard and to use budded stock, as all grafted trees are worthless and those who sell them are swindlers." It is

hardly credible, but many young and thrifty orchards have been thus dug up.

It is the duty of every member of the State Horticultural Society to see that these fellows are exposed and kicked out of this state. A law was passed by the legislature of 1887, requiring all who sell nursery stock grown outside of the state of Minnesota to file a bond of \$2,000 with the secretary of state, to protect purchasers of said stock from fraud and misrepresentation. Any agent offering foreign grown nursery stock is compelled to exhibit to each purchaser a certificate from the secretary of state showing that he has filed said bond.

The evil effects of this "model orchard" work can hardly be estimated. It does not stop at the damage done to the planter in dollars and cents, but it undermines the efforts of all true horticulturists who have the fruit growing interest of the Northwest at heart. The planter who has been duped sets all nurserymen down as frauds, and will refuse to purchase trees or plants for years. These swindlers and, indeed, in self-protection, all agents operating for nurseries outside the state, where they cannot easily be reached, should be compelled to show a certificate from the secretary of state (a copy of which and the law is given below in the case), or in its absence be treated to a good dose of Minnesota law.

The farmer who believes that in the digging up of his root-grafted trees and the planting instead of budded ones he has at last found the key to successful fruit growing, should at least see that all notes given in payment of any "model orchard" are not negotiable, but conditioned upon the fulfillment of the "model orchard" contract by the nurseryman.

(It is not easy to sympathize with the victims of this budded tree fraud. With the efforts being made in our state by this society—to say nothing of the many other sources of information—it would seem as though all planters should be fairly well informed on ordinary horticultural subjects.

Moral: Save your money by paying \$1.00 to become a member of this society; and buy your trees only of responsible Minnesota nurseries.—SEC'Y.)

THE LAW AGAINST NURSERY FRAUDS.

AN ACT

To prevent the practice of fraud by tree peddlers and commission men, in the sale of nursery stock.

Be it enacted by the Legislature of the State of Minnesota:

SECTION 1. It shall be unlawful for any person, corporation or association to sell or offer for sale any tree, plant, shrub or vine not grown in the State of Minnesota, without first filing with the Secretary of State an affidavit setting forth his name, age, occupation and residence; and, if an agent, the name, occupation and residence of his principal, and a statement as to where the nursery stock aforesaid to be sold is grown, together with a bond to the State of Minnesota in the penal sum of two thousand dollars (\$2,000), conditioned to save harmless any citizen of this State who shall be defrauded by any false or fraudulent representations as to the place where such

stock sold by such person, corporation or association was grown, or as to its hardiness for climate. Provided, that the bond aforesaid shall, when the principal is a resident of this state, be given by such principal, and not by the agent.

SEC. 2. The Secretary of the State shall, on the full compliance with the foregoing provisions, give to the applicant aforesaid a certificate under his official seal, setting forth in detail the facts showing a full compliance by said applicant with the provisions of this act. And said applicant shall exhibit the same or a certified copy thereof to any person to whom stock is offered for sale.

SEC. 3. Any person, whether in the capacity of principal or agent, who shall sell or offer for sale any foreign-grown nursery stock within this state, shall furnish to the purchaser of such stock a duplicate order, with a contract specifying that such stock is true to name and as represented.

SEC. 4. Any person, whether in the capacity of principal or agent, who shall sell, or offer for sale, any foreign-grown nursery stock within this state, without complying with the requirements of this act, or shall refuse to exhibit the certificate mentioned in section two (2) of this act, whenever demanded, or shall by means of any advertisement, circular, notice or statement, printed or written, published or posted, or circulated by the agency of any officer, agent or other person, or by any other means, shall falsely represent to any person or to the public that said nursery stock is grown in this state, and is hardy and is adapted to this climate, shall be deemed guilty of a misdemeanor, and upon conviction thereof by any court of competent jurisdiction shall be punished by fine of not less than twenty-five nor exceeding one hundred dollars, or by imprisonment in the county jail for term of not less than ten nor more than sixty days, in the discretion of the court, and shall be liable to the party injured in a civil action for treble the amount of damages sustained; and such party in such civil action may sue in his own name on said bond for the amount of such damages.

SEC. 5. This act shall take effect and be in force from and after its passage.

Approved March 8, 1887.

FORM OF CERTIFICATE REQUIRED.

To all to whom these presents shall come, greeting:

I,.....Secretary of State of the State of Minnesota, hereby certify that in accordance with the provisions of Chapter..... of the General Laws, A. D. 1887, of said state, one.....did, on the.....day of.....189., file with me an affidavit made in due form, wherein it is set forth, among other things, that the affiant is the agent of one.....; that said principal's age is .. years; that his place of residence is; that by occupation he is a.....; and that the nursery stock to be sold by said.....as the agent of said.....in this State, is grown at.....in the state of.....

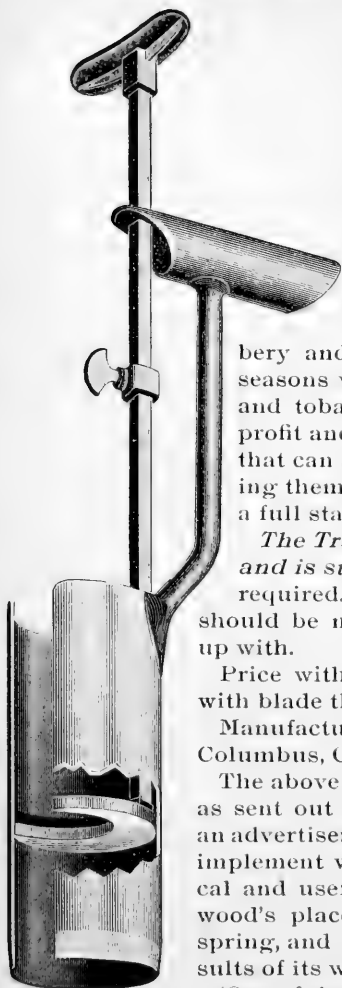
I further certify, that.....did, at the time of filing said affidavit with me also file, in the same manner, a good and sufficient bond, conforming in all respects to the requirements of the said chapter....., hereinbefore referred to.

Given under my hand and official seal, this.....
day of.....A. D., 189...

{ SEAL. }

Secretary of State.

THE BALDRIDGE TRANSPLANTER.



The transplanter shown in the accompanying cut is the result of twenty-five years practical experience as a nurseryman. The most delicate plants moved with them do not even wilt, as the soil is taken up with the plant and the roots remain in their natural position in the soil; thus the plant is not stunted and is insured an earlier and larger crop.

Vegetables, flowers, strawberries, cucumber and melon plants, shrubbery and nursery trees may be moved at all seasons with absolute safety; also corn, cotton and tobacco may be transplanted with great profit and advantage, taking sprouts from hills that can spare them or from seed beds and placing them where vacancies occur, thereby giving a full stand of uniform size.

The Transplanter is made of steel and iron and is substantial. It is adjustable as to depth required. Holes in which to set plants, etc., should be made with the same tool they are taken up with.

Price with blade two inches in diameter, \$1.25; with blade three inches in diameter, \$1.50.

Manufactured by Rickenbacher & Baldridge, of Columbus, Ohio.

The above description is in substance the circular as sent out by the makers. It is not put in here as an advertisement, but to call your attention to a new implement which is apparently thoroughly practical and useful. It was used at President Underwood's place in transplanting strawberries last spring, and it was a pleasure in July to see the results of its work this very dry season.

(One of the two-inch size—that used for strawberries, etc. can be seen at this office; and if desired, arrangement can be made to furnish them here at manufacturers' prices, saving the express or freight charges from the factory in Ohio.—SEC'Y.)

COME TO THE STATE FAIR.—In spite of the dry season, there will be a good display of horticultural products. Do not fail to come.

THE MINNESOTA HORTICULTURIST.

VOL. 22

OCTOBER, 1894.

NO. 9

Apiculture.

MINNESOTA BEE-KEEPERS' ASSOCIATION.

REPORT OF ANNUAL MEETING, 1894.

OFFICERS.

J. P. West, <i>President</i> ,	-	-	-	-	-	Hastings
Wm. Danforth, <i>Secretary</i> ,	-	-	-	-	-	Red Wing
L. E. Day, <i>Treasurer</i> ,	-	-	-	-	-	Farmington

Vice-Presidents, one from each congressional district.

First Cong. Dist.,	John Turnbull,	-	-	-	La Crescent
Second	H. J. Ludlow,	-	-	-	Worthington
Third	C. C. Aldrich,	-	-	-	Morristown
Fourth	J. E. Jackman,	-	-	-	Stillwater
Fifth	Wm. Urie,	-	-	-	Minneapolis
Sixth	J. M. Doudna,	-	-	-	Alexandria
Seventh	James L. Gray,	-	-	-	St. Cloud

ANNUAL MEMBERS.

C. Theilmann,	-	Theilmanton	H. H. Heins,	-	-	-	Lydia
D. B. Messer,	-	Plainview	J. C. Pope,	-	-	-	Mora
Edward R. Pond,	-	Bloomington	J. A. Holmberg,	-	-	-	St. Paul
H. L. F. Witte,	-	Minneapolis	J. W. Murray,	-	-	-	Excelsior
H. G. Acklin,	-	-	St. Paul	Mrs. J. W. Blackwell,	-	-	Alexandria
Wm. F. Cross,	-	-	Hamline	Frank Moeser,	-	-	Minneapolis
Barnet A. Taylor,	-	Forestville	John M. Seiler,	-	-	-	Chanhassen
E. R. Jaques,	-	-	Crystal	J. G. Bass,	-	-	Hamline
A. S. Lovett,	-	-	Minneapolis	N. P. Aspinwall,	-	-	Harrison
W. J. Tingley,	-	-	Stillwater	W. H. Bright,	-	-	Mazeppa
W. H. Putnam,	-	-	River Falls, Wis.				

HONORARY MEMBERS.

Mrs. Geo. N. Hart,	-	-	-	-	Hagar City, Wis.
Mrs. A. A. Kennedy,	-	-	-	-	Hutchinson, Minn.
Mrs. J. McClane,	-	-	-	-	Lake Harriett, Minn.
Thos. C. Russell, until Jan., 1896,	-	-	-	-	Minnehaha Falls
Roy Underwood, until Jan., 1896,	-	-	-	-	Lake City

PROCEEDINGS.

Of the Fifth Annual Convention of the Minnesota Bee-Keepers Association, held in the Lumber Exchange, Minneapolis, Minn., January 10th, 11th and 12th, 1894.

Wednesday Morning Session, January 10th.

The association was called to order by the president, J. P. West. The members present desired to hear the subject of "Apples and General Fruits" discussed by the Horticultural Society, so it was agreed to take a recess until 1:30 P. M.

Wednesday Afternoon Session, January 10th.

The meeting was called to order by the president, J. P. West. The reading of the minutes of the last meeting was unanimously dispensed with, and the society proceeded to transact its business. The treasurer, L. E. Day, of Farmington, submitted the following report:

TREASURER'S REPORT.

Mr. President, as treasurer of this association, I submit the following statement of receipts and disbursements for the year ending January 9, 1894:

January 12, 1893, balance on hand.....	\$27.30
Received at the annual meeting, 1893.....	15.00
May 10th, for dues.....	.50
May 14th, for dues.....	.50
Total receipts.....	\$43.30
Paid J. P. West, for programs and postage.....	\$6.00
Balance in treasury.....	37.30
Total.....	\$43.30

J. P. West, who was appointed at the annual meeting, 1893, to procure the passage of an act to prevent adulteration of honey and prevent its sale, reported that he succeeded in procuring the passage of the following law, but that by an oversight the dairy and food commissioner supposed that the bill was killed and it was not included in the laws sent out by the commission; but that the commissioner was doing all in his power now to prosecute the rascals who insist on violating the laws of the state and selling adulterated honey.

ACT TO PREVENT FRAUD, &c.

An act in relation to the sale of honey compounded or adulterated, and to prevent fraud and to preserve the public health.

Be it enacted by the Legislature of the State of Minnesota:

SECTION 1. It shall be unlawful for any person or persons within the state of Minnesota to offer for sale, or have in their possession with intent to sell, sell or cause to be sold, honey compounded,

manufactured from or mixed with glucose, sugar syrup of any kind or any substance whatever not the legitimate and exclusive product of the honey bee, unless the package containing same is so marked and represented as such, and bearing a label upon the package, printed thereon in heavy gothic capitals eighteen point, giving the name of the person or persons having compounded, manufactured or mixed the same, and the name of the substance or material from which it is compounded, manufactured or mixed with.

SEC. 2. It shall be unlawful for any person or persons within the state of Minnesota to offer or have in their possession for sale, sell or cause to be sold, honey which has not been made by the bees from the natural secretions of flowers and plants, but which has been stored or made by the bees from glucose, sugar syrup or any other material or substance fed to them, unless the same is marked, represented and designated as such, and bearing a label upon each package printed in heavy gothic capitals, eighteen point, thereon, giving the name of the person or persons who fed or caused to be fed the substance or material from which the same is stored or made, and the name of the substance or material from which the said honey is stored or made.

SEC. 3. Any person or persons violating sections one and two of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof, be punished for each offense by a fine of not less than fifteen dollars or more than one hundred dollars, or by imprisonment in the county jail not exceeding thirty days, or both such fine and imprisonment.

SEC. 4. The having in possession by any person or persons or firm any honey compounded, manufactured or mixed as hereinbefore described or any honey stored or made by the bees as hereinbefore described and not labeled as provided in this act, shall be considered prima facie evidence that the same is kept in violation of the provisions of this act.

SEC. 5. It shall be the duty of the State Dairy and Food Commissioner and his assistants, experts, chemists and agents by him appointed, to enforce the provisions of this act.

SEC. 6. The said commissioner and his assistants, experts, chemists and others by him appointed, shall have access, ingress and egress to all places of business and buildings where the same is kept for sale; they also shall have power and authority to open any package, car or vessel containing such articles which may be manufactured, sold or exposed for sale in violation of the provisions of this act, and may inspect the contents thereof, and take samples therefrom for analysis. All clerks, book-keepers, express agents, railroad agents or officials, employes or common carriers or other persons shall render them all the assistance in their power, when so requested, in tracing, finding or discovering the presence of any prohibited article named in this act. Any refusal or neglect on the part of such clerk, book-keeper, express agent, railroad agent, employe or common carrier to render such friendly aid, shall be deemed a misdemeanor and be punished by a fine of not less than twenty-five dollars or more than fifty dollars for each and every offence.

SEC. 7. In all prosecutions under this act the costs thereof shall be paid in the manner now provided by law, and fines shall be paid into the state treasury.

SEC. 8. All acts and parts of acts inconsistent with this act are hereby repealed.

SEC. 9. This act shall take effect and be in force from and after its passage.

Approved April 17, 1893.

The association then proceeded to the election of officers for the ensuing year which resulted as follows: [(See list on first page of this number.)]

The president then delivered the following address:

PRESIDENT'S ANNUAL REPORT.

Ladies and Gentlemen: It becomes my duty to address you upon matters which I believe interest every bee-keeper in Minnesota and this association.

1. The danger menacing every bee-keeper from the spread of foul brood. So far as I know it is now confined to that portion of the state in which I live. Do you as bee-keepers desire a law to suppress and stamp out this disease, which is so dangerous to your interest and success? If so, what shall it be, and what steps will this association take in the matter? It seems to me that it would be wise to appoint a committee to ask such legislation as may seem proper to this association.

2. Adulteration. The greatest evil which the honest honey producer has to contend is the rascal who is adulterating honey with glucose and selling it broadcast all over the state. A law was passed last winter, which, if enforced, will stop its sale, but it is defective in that it does not provide for the seizure of the stuff wherever found. I recommend that a committee be appointed to look after this matter and steps be taken to punish the rascals who are determined to violate the laws of our state.

3. Shall we seek to establish an experimental station at the State Experimental Farm, which is already an honor to the state and a great help to many branches of industry of the farmers of the state. Of course, it will be in a small way at the start, but it may become a great benefit to our industry in the future.

4. I recommend that a committee be appointed to look after and revise the premium list at our state fair, and that we ask for a larger amount of premiums from the State Agricultural Society. Our industry is increasing and growing in importance, and it only needs encouragement and help in proportion as other industries of our great state. We are entitled to recognition, and we must demand it.

While the last year has been one of great depression in the financial world, yet the average bee-keeper is not discouraged. While bankers and others interested in finances are in many cases seeking far off countries, beyond the reach of the strong arm of the law, and others are making assignments, yet the bee-keeper, if honest, proposes to stick right to the little busy bee. Improvements are being made in our occupation, and our prospects are brighter than ever before. [With laws to drive out the dishonorable and miserable scamps who are now] destroying our honey market with the cheap and adulterated stuff, our success is assured if we stand firm and shoulder to shoulder.

Discussion of the address resulted as follows:

First. It was moved and carried that the executive committee of the association apply to the legislature for an appropriation to be used in stamping out foul brood in the state, and that the same, if procured, should be expended by said committee.

Second. That the chair appoint a committee of three to revise the premium list for honey at the State Agricultural Society. The chair appointed Wm. Urie, E. K. Jaques and H. G. Acklin.

Third. It was moved and carried that the executive committee of the society be instructed to ask of the state fair managers a larger amount in premiums for honey and apiarian supplies for the bee-keepers of the state.

Fourth. It was moved and carried unanimously, that a committee consisting of J. P. West, E. K. Jaques and Wm. Urie be appointed to draft resolutions condemning adulteration of honey and sugar, syrup and all kinds of sweets and present said resolutions at the joint meeting of the Minnesota Bee-Keepers' Association, and the Minnesota State Horticultural Society on January 12th.

Fifth. It was voted by the association that the executive committee be requested to present the matter of an experimental station in bee-keeping to the officers at the Agricultural Experiment Station.

Messrs. Barnett Taylor, of Forestville, J. M. Doudna, of Alexandria, and C. Theilmann, of Theilmanton, said that if the officers at the Agricultural Experiment Station would undertake any such work that they each would donate one colony to the said station, if desired, for such work. The members of the association were of the unanimous opinion that good work was being accomplished at the station for the farmers in the state.

The society unanimously passed the following resolution:

Be it resolved, That we tender to the Minnesota World's Fair Commissioners our sincere thanks for the interest manifested by said commissioners in our industry and for the benefits derived from their causing an exhibit of honey and apiarian supplies from Minnesota to be made at the Columbian Exposition.

Mr. Urie introduced the following resolution which was unanimously adopted:

Resolved, That we tender to Mr. West, our president, our hearty thanks for the able manner in which he has acted as president of this society and for the interest he has taken in our behalf.

Recess was taken for ten minutes to enable members to pay their dues and sign the constitution and by-laws, after which C. C. Aldrich read the following paper:

BEE DYSENTERY, ITS CAUSE AND CURE.

C. C. ALDRICH, MORRISTOWN.

So much has been said and written on the subject that it seems useless to say more; but as the question is an undetermined one, and the subject has been given me to express my views, I will say what I did in 1873 and 1874 (see American Bee Journal, Vol. 9, No. 1, 1873).

There are a number of causes that produce this disease. The principal causes are a surplus of pollen in the brood nest, cold and dampness, which sours the pollen, the honey absorbing the poison, and the bees by eating the pollen and honey become diseased. The causes of an overplus of pollen in the brood nest are several. The colony of bees that has a surplus of pollen is in an abnormal condition. If the colony in a honey flow fills its brood nest to a limited extent, the young bees will consume the pollen; but if, after a honey flow, a dearth of honey comes on in August in Minnesota and the pollen is about all that can be gathered, the consequen-

ces are the brood nest is filled with pollen, and unless unexceptional winter quarters are provided the bees will invariably have the dysentery.

In 1873-74, I had fifty colonies of bees, and in my vicinity there were a number of apiaries containing a hundred colonies or more. Bee-keeping was at that time booming, and the proprietors, wishing to make all they could out of their bees, prevented swarming and extracted until the end of the season, and then divided their bees to increase their stock. The results were they lost 90 and 100 per cent. the next winter, while those who pursued the good old way of letting their bees swarm naturally and in season did not loose over 10 per cent.

In the winter of 1874, wishing to test my theory, I prepared two colonies of bees for wintering, by taking all of the pollen from one hive and giving it to the other. They were placed in the same cellar, and wintered the same. The one without pollen did not spot the snow when set out of winter quarters, while the other was badly diseased.

While I claim the reasons given are the principal ones, there are others that help to make up the general results. The hives can have an overplus of pollen, and if the winter quarters are of the proper temperature and not too damp, the bees will winter without much trouble; but if they are allowed to stand out in zero weather and then put into winter quarters with combs frozen and the cellar cold and damp, the bees will invariably become diseased.

Most bee-keepers have noticed, I presume, that bees hardly ever are diseased until brood is hatched, as old bees are not expected to eat pollen when good honey is at hand. It seems to me that in giving the cause that the cure can easily be guessed.

First. I would follow nature as far as possible in letting the bees swarm naturally.

Second. The hive should have a brood nest adapted to its surroundings, that is, the brood nest should be smaller in a location where the honey season is short than where bees can gather honey the year round.

Third. The surplus should not be taken away at the expense of the colony. It is better to crowd the bees a little than to have the body of the hive filled with pollen. For that reason I would not extract until the season was really over. It seems to be folly to kill the goose that lays the golden egg, or extracting in June from the body of the hive in most seasons will end in the loss of the colonies.

Fourth. Young queens, not over two years old, should be used. They will keep down swarming, they will be more prolific and help to make up what might be called a loss, by not extracting as soon as the honey is placed in the cells or by removing the boxes early to make a show of whiteness.

I am aware that many bee-keepers will not agree with me in my views, as expressed herein. They will say that I am behind the times. But until this question of dysentery is settled beyond a doubt, I shall hold that it is better to go slow and sure than to be running blindly in the dark.

Is it not better to make a success in wintering than to get a few more pounds per colony and lose them in the winter? In the latter we have a precarious pursuit, that in the end is a loss to the bee-keeping fraternity. For I am of the opinion that bee-keeping is yet in its infancy; I believe that not one pound in ten of honey is gathered that could be if the pursuit could be made popular by success in wintering. If it could be made popular like dairying, more would eat honey, and that would create a demand that in time would make honey a staple article.

But I have digressed from my subject, and I have done so to apologize for what you may think are my short comings.

For a person with a few colonies that have the dysentery it is an easy matter to cure them, by having a loose bottom board to the hive. Remove the bottom board and heat it hot over the stove. If the hive is in good winter quarters, once or twice heating of the bottom board will effect a cure.

When a colony is diseased when set out in the spring, I remove all of the sour pollen and open honey, and replace it with untainted honey, and feed syrup from sugar and rye flour, if pollen cannot be gathered.

Hoping that the time will soon come when by proper experiments and observations we shall arrive at a definite conclusion as to the causes and cure of this disease, I will only say that all I might say will not prove anything definite. We should have an experiment station, and such subjects should be decided without a doubt, discussion on this subject will not amount to much unless some experiments are made with a desire to prove the truth.

An animated discussion followed the reading of this very interesting essay, and all the members present took a hand in solving the great problem.

The winter of 1892-3 seemed to have been a very disastrous winter for many apiaries in Minnesota, and dysentery seemed to have been the prevailing disease. It was generally admitted that Mr. Taylor was, as a rule, correct when he said "warmth, dryness and wholesome food will prevent dysentery," although cases were related where the conditions exactly reversed seemed to exist, and yet the bees wintered all right—but I presume the food was "wholesome". As a general rule, in Minnesota the season of 1892 was a poor one, and the fall crop of honey was short and poor, or at least the honey was considered poor—so many colonies died from dysentery with all the other conditions apparently the same where the bees had wintered successfully winter after winter. In many cases the colonies were light and but few young bees. Mr. Urie said that his bees were strong and had plenty of honey and apparently the quality was good, but his bees showed signs of dysentery before they were put into the cellar, and he lost nearly all where he had wintered very successfully before. As to what extent pollen affects the bees by their not having enough, too much or not any or that which is poor, no one present could tell from actual knowledge derived from experiments, but there seemed to be a general admission

that bees should have a certain amount of "wholesome" pollen, and the question was left to be decided hereafter.

The following reports were then read:

BEE-KEEPERS REPORTS.

Report of Frank Moeser, St. Louis Park, Minn.

In the fall of 1892, I put 90 colonies (mostly in 10 frame Simplicity hives), in the cellar, of which 65 came out all right, but 25 died on account of dampness in the cellar. Increased the 65 colonies to 70 last summer, and produced 3,000 pounds of extracted honey, mostly white. I have used a 16 frame hive with two queens—separated with a wire screen—used queen excluder, and had them work together in the super—they did well.

Report of J. L. Gray, St. Cloud, Minn.

Loss in winter and spring of 1893, was 67. Number of colonies in spring of 1893 was 75. Increase, 17. Purchased, 36. Total, 128. Comb honey, 400 pounds. Extracted, 500. Total 900 pounds. Beeswax, 90 pounds. I used mostly 9 frame L hives. The poorest season in my experience of 43 years.

Report of John M. Seiler, Chanhassen, Minn.

I put in the cellar in the fall of 1892, and took out in the spring of 1893, 14 colonies, but 3 died soon after. I received from the 7 strongest colonies, 15 swarms, and from the next 2 strongest, 50 pounds of honey each. From my first prime swarm of 1893, I received 90 pounds in one pound sections. I have now 20 colonies in the cellar.

Report of C. Theilmann, Theilmanton, Minn.

Put into winter quarters, fall of 1892, 325 swarms. Dead when set out in spring, 1893, one colony. Lost 35 by dwindling after being set out. Sold in spring of 1893, 43. Started the season with 335. Obtained comb honey, 10,700 pounds. Extracted 300 pounds. Sold in fall, 113 colonies. Went into winter quarters with 222. Beeswax, 50 pounds.

Report of Thomas E. Russell, Minnehaha Falls, Minn.

I put into the cellar, fall of 1892, 22 colonies in good condition, most of them with sealed covers. One died in the cellar through being queenless, and one other of diarrhoea after being set out in the spring. Total loss, 2. Four were worked for comb honey and 16 for extracted, receiving 130 pounds of comb honey and 1,000 pounds of extracted. Total, 1,130 pounds. We increased from 20 to 42 by natural swarming, besides making four nuclei of 4 frames each. We use Root's dovetailed hives and the Hoffman frames, and find them very satisfactory.

Report of Central Apiary, C. C. Aldrich, Morristown, Minn.

Placed in the cellar in fall of 1892, 100 colonies. Set out in the spring, 95; lost in wintering, 5; lost by spring dwindling, 7; sold, 10. Increased in season of 1893, 110; united, 7; have now in cellar 103. Have taken 600 pounds extracted and 1,000 pounds of comb; sold 50 pounds of wax. It was the poorest season I have had for 25 years. Causes, wet spring and very dry summer.

Report of Mrs. B. J. Livingston, Center Chain, Minn.

In November, 1892, I put 40 colonies in the cellar, several of them being late and second swarms. They all lived to come out of the cellar, but during April, 1893, I doubled them back to 32. They increased during the summer to 42. They are in ten frame hives, heavy with honey, and apparently wintering well—in the cellar, of course. I harvested 2,400 pounds of comb honey; no extracted; no beeswax. There was no linden honey capped at the close of that harvest. Much of my honey was dark, but the very latest gathered was a few hundred pounds of very light honey, almost water white; this with the dainty golden rod honey was my best grade. We have no white clover yet.

Report of Mr. Urie, Minneapolis.

I started to winter 94 colonies and lost 78, leaving 16 colonies to commence the honey season with. I bought seven colonies, or rather small nuclei, and increased them up to 34 good colonies and took about 300 pounds of comb honey and 800 pounds of nice extracted honey, beside raising a good many queens. I did well, considering the condition that the bees were in in the spring, and it was not a first-class honey season. I am very thankful for what I got.

The question then came up as to the comparative merits of queens reared in the South and North, and was thoroughly discussed. It was unanimously decided that queens from the South, as a general thing, do not compare with Northern reared queens for hardiness. It was the advice of all the old bee-keepers present to purchase queens for Minnesota as far north as possible. The discussion also developed the fact that the majority of those present preferred queens reared in the natural way, as they in majority of cases proved superior to those reared artificially.

Thursday Morning Session.

THE HONEY EXHIBIT AT THE WORLD'S COLUMBIAN EXPOSITION.

C. THIELMANN, THIELMANTON, MINNESOTA.

Mr. President, Ladies and Gentlemen: The honey exhibit and items of interest at the World's Columbian Exposition, is the subject for a paper allotted to me by our worthy president. This really should have been a part of our secretary's duty, but as he is not here I will do the best I can. I do not feel able to give satisfactory information as I did not expect I should have anything to say here about the Columbian Exposition, or I should have made a little closer investigation of the more important things of interest for this association; but I will mention a few things as they came under my observation.

I started for Chicago in time to meet with the North American Bee-Keepers Convention, which was held from October 11 to 13. This convention turned out to be one of the largest gatherings of bee-keepers that has ever been held in America. It was a pleasure to meet so many bee-keepers face to face whom we never saw before, though I have read their writings in the bee journals. I must say that I was very much surprised at the personal appearance of some of

them, while others were as I expected to see them, which opinion I had obtained from their writings, and had pictured them before I had seen them. The difference in this respect is a great as when we read a description of a country instead of traveling over the same.

We made many personal acquaintances and gained much practical knowledge by attending these meetings. On the other hand, these meetings could have been more fruitfully conducted if there had been less fun; too much of it spoils the business character. It is not a very pleasant duty to be kicking at any one, nor is it fashionable to do so in this enlightened age, but less so to flatter, where kicking would be more wholesome. Partiality has also found a place for a certain class, which don't look just right and should be kept out.

There were five Minnesota bee-keepers at the convention at the roll call of the different states. I remember Hon. J. W. Thompson and Mr. Barnett Taylor and son—the latter roosted in the same room with me, until to my sorrow the senior member got sick with a cold and started for home before the meeting was over. We also had one of Michigan's sugar honey advocates, Mr. Hutchinson of Flint, roosting with us. It was a big trial for me to keep silent on the sugar dogma, until the last hour before we parted, when it broke loose. There is some satisfaction in that Mr. Hutchinson sees his mistake in advocating sugar honey. I understood him to say that he would keep it out of the Review. I felt rather sorry for him when a spirited Ohio bee-keeper came up to him at the hotel and in a laughing and friendly manner looking at his badge, exclaimed, "Hutch., you had better have a sugar barrel on your badge instead of a bee-hive." I did not hear Mr. H. say anything at the sessions. There was great applause and cheers when Prof. Wiley and Mr. Newman renewed friendship by a hearty handshake. The Prof. is a well informed honey man, and a good speaker, and he gave us some interesting lectures on chemistry. R. I. Taylor, the experimenter at the Michigan station, had probably more to say than any other bee-keeper in the convention. The high spirited St. Joe delegate, elected president for the present year, Mr. Abbott, told them frankly that Mr. Taylor and others were well paid from the state for their hair-splitting experiments, in which there was no particular benefit for the average bee-keeper, or words to that effect.

Mr. Benton read an essay, "How to Make Bee-Keepers Conventions Interesting and Beneficial." He told us of the "Wanderversamlungs" in Germany, i. e. wander-meetings, nomadic-meetings, bee-keepers meetings, held here and there. "Mess a mess" is a yearly market in large centers to which all kinds of products are brought and sold. To the "Wanderversamlungs" they bring bee products and sell them for a week or more.

Mr. Miller attended to the chair promptly and performed the duties of his office well—he lost his head only once. Dr. Mason is "love" himself, so hearty and friendly, accomodating and obliging, in one word, "all love." I hardly think he could kill a fly. I was much surprised in A. I. Root's appearance. Judging from his

writings most any one would think that he would be a man of quick motions and temperment, but his movements were moderate and calm; his eyes are small, sharp, nearly stinging; his nose very thin and sharp between the eyes. I like to read Mr. Root's writings as I can learn much by them; there are many practical hints in them, even if he mixes up business and religion quite often to gain profit. When I asked him if he came to Chicago on his bicycle, he soberly said "no, I came on the cars all the way." His son, Earnest, is almost the picture of his mother, who appears to be (judging from the conversation I had with her) a very sensible, good lady. There were many more noted bee-keepers and editors of bee papers at the convention—but my paper is getting too long to say any more about the convention.

I arrived at Chicago two days before the convention, which time I spent on the fair grounds. I first went to see the honey exhibits in the southeast part of the gallery in the Agricultural Building, and found an excellent display from the products of the honey bee, and more machinery in the shape of bee-hives, &c, than I have any use for; nevertheless, there were also many useful implements and practical supplies on exhibition. The Minnesota case was hardly filled up as much as most of the other states, but was strengthened very much the next day with a part of 500 pounds of comb honey which I had sent to Mr. Cooper some time in August. This was a very fine lot and made a good showing with what had been there before, which was mostly extracted honey from last year's crop. I could not find any one who attended our exhibit, though I enquired considerably, nor could I find my supplies which I had sent for exhibition to Mr. Cooper early in the season. They were somewhere in Chicago, but not on exhibition, as they came back to me from Chicago by express after the fair was over, except the cover of the hive was missing.

After the adjournment of the North American Bee-Keepers Convention, at the honey exhibit I met Mr. Secor, the honey judge, right at our case—he said "I am glad to meet you here." He wanted to know who was in charge of our honey exhibit. Of course that was just what I had been trying to find out, and told him so. Then we looked the contents of our case over, and we came to the lot I sent. I asked him how he liked that and he said "that is very fine indeed," You all have probably seen in the American Bee Journal that Mr. Secor has awarded us the prize for the best display of comb honey. The straw skip in the case attracted much attention from the visitors. There was only about half of the honey in the case which I had sent to Mr. Cooper. I don't know where the balance was. I asked Mr. Cooper about it, but he did not answer my question directly, but wrote among other things that after he arranged the exhibit in the case he was not wanted there any longer, so he went home. I am sorry to say that other things came to my knowledge of which I would not like to say any thing about here, as it is not any credit to those concerned—it affects us all in that we have made a mistake, or, rather, we were badly deceived. I would advise every bee-keeper, yes, everybody else, to keep their skirts clean from all impurities.

The old saying is, there is no roses without thorns. With us there is some satisfaction in getting the prize, while on the other side we got a licking—therefore let us forget the licking and cheer over the prize.

Outside of the title of my paper I will say I did not have a full honey crop but am well satisfied and thankful with what I had—the quality was very fine, which is proved by the honey judges and bee-keepers, as they gave me the first and second prize on comb honey at the Minneapolis Exposition, and I have no doubt that the lot I sent to the World's Fair did much towards getting the prize awarded to us there. I feel happy and thankful that I was permitted to assist in obtaining these gratifying results, over which we all can feel cheerful.

Mr. Urie presented the following resolution which was unanimously adopted, *Resolved*, that we, the bee-keepers of Minnesota in convention assembled, heartily thank the Minnesota State Horticultural Society for the use of the hall for this meeting, which has been provided for us through the kindness and generosity of the said Horticultural Society without charge.

The following resolution was presented by Mr. Urie and Mr. Jaques, the committee on resolutions, and after a thorough discussion by all the members present it was unanimously adopted:

Whereas, it is reported, and we believe susceptible of positive proof, that one F. H. Hunt, of Redlands, California, did in the fall of 1893, ship honey to St. Paul, Minn., and did, at the commission house of Smith & Austrain in said city, mix, compound and adulterate the said honey or portion thereof with glucose; and did sell, and offer for sale the said adulterated honey in the city of St. Paul, and in other portions of the state, contrary to the laws of the state; now, therefore, be it resolved, that we denounce the alleged action of said Hunt as dishonest, and a crime against the laws of Minnesota, and that by his said action, he has proved himself unworthy of the patronage and confidence of honest people.

Friday Morning Session.

This session was held jointly with the State Horticultural Society. After calling the meeting to order President West read the following extract from the report of the Dairy and Food Commissioners for 1893:

HONEY.

This article of the dietary, which is so generally known for its pleasant saccharine qualities, has received but a limited amount of attention from the commission; not because honey was considered by this department above suspicion of being adulterated, but owing to the fact that it did not come within the jurisdiction of our law.

Our state furnishes an excellent article of honey, and a goodly number are engaged in the business of bee-keeping. Another matter in this connection is well worthy of notice; a large amount of capital has within a few years been invested in apiaries.

The following figures taken from the annual report of the Commissioner of Statistics fully illustrate the rapid growth of the honey industry in our state:

Number of hives in 1893.....	22,063
Number of hives in 1873.	10,376
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Increase in twenty years.....	11,687
Number of pounds of honey in 1893.....	243,466
Number of pounds of honey in 1873.....	134,276
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Increase in twenty years.....	109,190

While we recognize the worth of the pure Minnesota product, yet there is much honey on the market that is spurious and adulterated. This evil is on the increase, and today it is a serious problem which confronts the men who desire to produce a pure article of honey. It is, therefore, a matter for our serious consideration; and in order that this important industry may receive a stimulus, it is incumbent upon the legislature to enact laws that will afford it the necessary protection and encouragement its importance demands. In all matters of food we cannot exercise too great care in denouncing the spurious and encouraging the genuine.

President West then proceeded to read the presidents annual address:

PRESIDENT'S ANNUAL ADDRESS.

Mr. President, Ladies and Gentlemen: In all walks of life we meet the honest and faithful man and women, we also often meet the false and spurious. There is no occupation, however high, but what contains some dross and adulteration; the merchant and dealer who sells his fellow man food and articles from which drinks are made is often so avaricious and so destitute of all honor and regard for the health of his fellow beings that he adulterates all articles of food that are susceptible of adulteration, such as honey sugar and sweets of all kinds. I am sorry to confess that the bee-keeper's ranks have not been purged to that extent but what some rascals are to be found. If there is anything that looks meaner to me and more contemptible than other meanness, or the same meanness in other people, it is a bee man who is determined to adulterate honey and palm it off on the innocent as the product of the noblest, and most wonderful little creature which God has made, "the blessed bee."

The man who breaks into my barn and steals my horse is an honorable man compared to the contemptible rascal who knowingly sells me adulterated honey or any adulterated food without informing me of its nature. The man who came from California with his honey, and deliberately and openly went to work and adulterated it with glucose, and sent it out to be sold, ought to be in Stillwater with Fleury who stole the gold from the Merchants Bank in St. Paul. The latter is not as dangerous to the health and welfare of society as the rascal who is making and selling us adulterated foods and drinks. The time has come when every bee-keeper in this association in Minnesota must go on record that such rascals must be

prosecuted. We must demand that every man elected to the legislature, regardless of politics, must be pledged to pass laws which will stop the adulteration of honey and all kinds of food, and to severely punish the rascals who persist in the nefarious practice.

In 1878, when I first became interested in bee-keeping, there was much said and published in the *Am. Bee Journal* upon this subject. The board of health of Michigan had occasion to examine some syrup that poisoned a family at Hudson in that state; also, other samples. Prof. R. C. Kedzie of the board, in making the report of the examination of that syrup and other samples, said:

"The Anglo-Saxon are pre-eminently a sugar consuming race. There are few luxuries so prized by Americans, for whom the chief articles of table luxuries have sugar as an important element. The large consumption of sugar is not confined to the wealthy, but is almost equally as common with those of limited means. To defraud the poor man of his sweet is to cheat him out of his chief table comfort which his poverty can afford. In making my selections for examination, I obtained specimens only from those who were regarded first-class tradesman. If syrups bought at such places are adulterated, we may well suppose that the inferior class of dealers will have no better articles. Some have said that undoubtedly poor people who trade at all groceries are swindled in these syrups, but that the respectable citizens who patronize first-class grocers need not apprehend any such imposition. I determined to follow up 'the respectable citizen' and see what syrups he obtained of 'first-class grocers.' Part of the specimens were obtained near home, but the most from abroad. I have examined seventeen specimens in all, with the general result that two were from cane sugar, and fifteen from 'starch sugar, or glucose.'

"Specific Results of Examination of Table Syrups.

No. 1—Pure sugar syrup.

No. 2—Starch sugar syrup; contains some sulphate of iron (copperas), and contains in each gallon 107.35 grains of lime.

No. 3—The grocer called it 'poor stuff.' I have seldom seen an article that better sustained its recommendation. Made of starch sugar; contains plenty of copperas and 297 grains of lime in a gallon.

No. 4—Nearly pure cane sugar syrup.

No. 5—Starch sugar syrup; contains copperas and 100 grains of lime in a gallon.

Nos. 6, 7, 8—All made of starch sugar; contain sulphate of iron and plenty of lime.

No. 9—This is the specimen from Hudson which caused the sickness in the Doty family. A starch sugar syrup; contains in the gallon 71.83 grains of free sulphuric acid, 28 grains of sulphate of iron and 363 grains of lime.

No. 10—Contains starch sugar, copperas and lime, amount not estimated.

No. 11—A starch sugar syrup; contains in the gallon, 141.9 grains of free sulphuric acid, 25 grains sulphate of iron and 724.83 grains of lime.

No. 12—Contains starch sugar, seasoned with sulphate of iron and lime.

No. 13—Starch sugar; contains in the gallon, 58.48 grains of sulphate of iron, 83.14 grains of free sulphuric acid and 440.12 grains of lime.

No. 14—Starch sugar; contains in a gallon, 80 grains of free sulphuric acid, 38 grains of iron and 262.48 grains of lime.

Nos. 15, 16—Contain starch sugar, sulphate of iron and lime.

No. 17—Starch sugar, sulphate of iron and 202.33 grains of lime."

"A very important element in this discussion is the great disparity in sweetening power between cane sugar and starch sugar, or glucose. One pound of cane sugar has the same sweetening power as two and one-half pounds of glucose. In these starch sugar syrups the public is not only treated with compounds loaded with foreign and injurious materials, but they are enormously cheated in the very thing they seek to buy, viz.: the sweetness."

"Tests. Strong tea will detect iron, or copperas. Lime may be easily recognized in the syrup by a solution of oxalic acid. Dissolve one ounce of oxalic acid in a pint of rain water; if the solution is not clear, let it stand for a few hours till it settles, then pour off the clear solution into a clean bottle and label it 'Oxalic Acid—Poison.' To test the syrup, place a tablespoonful in a tumbler half full of rain water, stir it up and add a tablespoonful of the oxalic acid solution. If there is much lime in the syrup it will show itself by a white precipitate, the amount of which will give some measure of the amount of lime present."

The following was published in "Gleanings", and taken from a German Bee Journal, the "Bienenvater", published in Vienna, Austria.

"1. Adulteration with glucose.—Take a tablespoonful of the honey to be tested; pour it into a small bottle; then add three spoonfuls of pure spirit, and shake the whole thoroughly together. In about a quarter of an hour there will form in the bottle a cloudy whitish sediment, and from this you may be sure the honey is adulterated.

"2. Adulteration with flour, starch, &c.—Pour into a tumbler partly filled with honey a few drops of the tincture of iodine, stirring it thoroughly with a glass rod. In a few moments, it will, if adulterated, be of a bluish color. If the honey is greatly diluted, it will form on the bottom of the glass a sediment of a deep sky blue color.

"3. Adulteration with flour.—Warm the honey until quite thin; let it cool off, and add very cold water, constantly stirring till the flour separates from the honey and falls to the bottom, where it is easily recognised.

"Additions of flour can be easily detected in such honey by warming it. It melts very slowly and burns easily.

"4. Adulteration with glucose.—Mix honey with boiling water; if it has not an aromatic smell, but smells of starch or fusil, it is adulterated with potato or starch syrup.

"Adulteration of syrups can be detected by putting a little in tea, which will turn the tea black if adulterated."

I speak of these facts because I think and believe that if we can

stop the adulteration of all kinds of sweets, we will be helping all honest producers and purchasers of such articles, and create a better market for our honey. If adulteration is dishonest and injurious to health, what is the duty of this association and all honorable men and women? It is to join in a crusade against the nefarious practice. Let us here and now pass resolutions condemning all adulteration in all forms, as dishonorable and a crime against health; appoint a committee whose duty it shall be to appoint a sub-committee in every county state to circulate and cause be circulated, petitions asking the next legislature to pass stringent laws to prevent adulteration of all sweets and articles of food, and put the same under the control of the Dairy and Food Commissioner; to see that all candidates for the legislature, irrespective of party, are pledged to this end; and to ask all honorable persons to join us in this effort.

DISCUSSION.

Mr. West: I have an explanation to make in regard to this matter. A year ago this winter I was appointed to draw up a bill to present to the legislature to prevent the adulteration of honey. It was brought before the legislature and passed. It was amended, and it is considered a very good law to prohibit the sale of adulterated honey. There was another bill up in regard to the adulteration of coffee, which was killed, and the Dairy and Food Commissioner supposed it was the honey bill which was killed, and so when they got out their little book they did not include that law. Sometime after, when I arrived home I saw an article in the American Bee-Keepers' Journal from J. A. Homburg saying that a man from California was in St. Paul selling adulterated honey, and that he had been to the Dairy and Food Commission about it and they had told him that there was no law against it. I went over to St. Paul the next Saturday, pretty hot, and they told me they did not know there was any law against it. I took down the law and showed it to them, and they were very much surprised. The Dairy and Food Commission did not intend to do anything injurious to the bee-keepers of Minnesota, but it was simply one of those mistakes that will sometimes happen. They are getting samples now and will prosecute those who are selling adulterated honey. I think it is due the commission to make this explanation, as they had supposed the law was killed. But we have no way to reach this man; he has left the state and we cannot bring him back to prosecute him as he ought to be.

I have a resolution here which I will offer to bring the matter before the association.

WHEREAS, The adulteration of honey, sugar, syrup and all kinds of sweets is largely practiced in the state of Minnesota; and

WHEREAS, Such adulteration is injurious to the honest producer and manufacturer, and hurtful and injurious to health, and dishonest and a fraud in practice. Now, therefore, be it

Resolved by this convention, that we are in favor of the passage of stringent laws to prevent such adulteration, and are heartily in sympathy with those laws already upon our statute books making the adulteration of certain foods a crime.

We, therefore, earnestly recommend that a committee of three be appointed by this convention whose duty it shall be to appoint a person in each county in this state to circulate or cause to be circulated a petition asking the members of the legislature of 1895 to pass laws making such adulteration a crime, and punishable by a severe penalty; and making it the duty of the State Dairy and Food Commissioner to enforce such laws. We also invite all honest citizens to join this association in its effort to stop and stamp out this great evil.

On motion of Mr. O. F. Brand the resolution was adopted.

Dr. Frisselle: I am quite in sympathy with the general tone of this paper. We heard adulteration objected to on the ground that it is not safe to allow any one to adulterate food products, but I think, also, there is another side to this question. Now, we have heard it stated in this meeting that certain food products contained a certain amount of sulphuric acid, and a certain amount of iron, as though that was something dreadful, but the real fact is that in the manufacture of glucose sugar, the glucose is converted into sugar by the mixture of sulphuric acid, which converts the starch into sugar. This glucose, as it is called, is not properly purified from the excess of sulphuric acid, that is, some of it is left in. Well, now, what is the effect of sulphuric acid upon the system? The doctors give it as a tonic. It is one of the best known tonics used in medicine, and a small amount of it does not do any harm, but it is healthy; and I think if some people would eat a little more sulphuric acid they would find it beneficial. The same is true of lime. Anybody who drinks hard water takes more into the system at one time than is contained in a gallon of syrup. Everybody knows that lime water makes a deposit on the inside of a tea-kettle. And the lime does not do any harm. Now, sulphate of iron is another thing. Sulphate of iron is a very powerful drug, and I suppose it was the sulphate of iron which produced the bad results mentioned here. I think we ought not to be too furious in our condemnation, but we ought to look at a thing as it really is, and to condemn the use of a little sulphuric acid would be simply foolish, and I think we ought to go a little bit slow.

Mr. West: There is nothing in my resolution in relation to sulphuric acid. The determination of honest men should be to sell honest goods without the articles being injurious to health; but I am glad to learn one thing; if I need a tonic it is not necessary to go to a doctor and have it prescribed, but I can simply buy some of this adulterated syrup. (Laughter.) I do not suppose any honest man, I do not suppose the gentleman who has just spoken, will admit that it is an honest practice on the part of any one. It simply shows what many will do, if they have no law to restrain them. When I go to a man's store to buy anything, butter, honey or anything else, and he knows it is adulterated, and I think I am getting an honest article, that man is dishonest. I should consider it a contemptible and mean thing in myself. I would condemn the action of any man who gets my money for anything that is not what it is represented to be or what I believe I am getting; a man might just as well steal it. Now, another thing. Our resolution is not very furious. These articles were analyzed by Prof. Kedzie of Michigan. He says that in order to use those articles for food a man would have to be tin-lined. I do not mean to say that the people in Minnesota are selling this stuff. I am told the man who wants it can have this adulterated syrup. I do not object so much to this stuff being sold, if the men who sell it will only tell those who buy what it contains. So far as honey is concerned, it would be all right, if he would only put on the bottle what the honey contains. But nobody would buy if they knew it was adulterated. I do not wish to condemn anybody in this resolution.

Dr. Frisselle: In regard to adulteration, it is mixing something else with the article we call by the proper name. Now, in regard to the adulteration of olive oil. I do not suppose in the whole state of Minnesota you could find ten gallons of pure olive oil, but it is made of or mixed with linseed oil, and that is sold for olive oil. It is just as good; it is a vegetable oil, people use it and it does no harm that I know of. In regard to syrup. Almost all of the syrups sold in the grocery stores for table use are glucose. There is not one specimen in a hundred but what is glucose almost pure. As I stated before, it is made of starch and sulphuric acid. The sulphuric acid is not all taken out, it is there, but there is no harm done. Glucose sugar, called grape sugar, is as good as any sugar. It does no harm. It has less sweetening power than cane sugar.

Mr. Theilmann: Lime does no harm?

Dr. Frisselle: It makes bones.

Mr. Theilmann: Don't you think we have bones enough already? (Laughter.)

Mr. Urie: I am surprised to hear the doctor advocate the adulteration of food. If this adulteration is allowed to go on we, as bee-keepers, might just as well go out of the business. As it is now, we have a line of Jews peddling this stuff all over the city, and if the idea goes out that this association does not condemn adulteration the whole city will be filled up with this article. I do not suppose we are more honest than other people, but we try to put up a straight article. I do not believe there are any bee-keepers that are adulterating honey in Minnesota. I do not think that any of them adulterate honey. I say as Mr. West has said, it is a shame and a disgrace to the American people; everything is adulterated, coffee, sugars and liquors of all kinds are adulterated. I am in favor of a law being passed sending a man to the penitentiary who is guilty of it. Every article should be branded with whatever it contains; then if the people want to buy it, I have no objection. But I will do all I can to have a law passed prosecuting the man who adulterates anything.

Mr. Taylor: I am not personally very much interested in adulteration, but I appreciate Doctor Frisselle's remarks. I feel just like this, I do not know whether I am in favor of any law against adulteration, except a general law to cover adulteration. It is true as he has said, everything is adulterated, and many things are very harmfully adulterated. It is a fact every thing is adulterated, and you can hardly select anything for food but what is adulterated. But we want a general law against adulteration. That is a true principle. In regard to this case of honey containing 75 per cent. of glucose. Now, gentlemen, let us be cautious about this thing. Any product I buy, I do not care how much is adulterated, so long as I am not harmed by that adulteration, I cannot object to. If I am not harmed by it, I do not care. That ought to be taken into consideration and must be, for general purposes. This gentleman spoke about olive oil. I do not think it does any harm if it is adulterated. It is agreeable, it is healthy and there is nobody harmed. My principle is, that anything that harms no one is all right.

Mrs. Kennedy: I would like to ask Mr. Taylor if he would like to have his butter made out of dirty, filthy grease. Just come now, wouldn't it make him sick? (Laughter.)

Mr. Bertrand (of the State Dairy and Food Commission): I am sorry to hear the last gentleman's remarks. I certainly disagree with him. Suppose he buys some milk in the city that is watered, it does no harm. If he buys milk at five cents a quart and it is watered, does he want to pay five cents for water? You do not want to pay twelve and one-half cents for honey, when glucose costs only one cent. I will say that honey adulteration in this state, I do not think, has been carried on to the extent we thought. There was some honey bought by Mr. Carmoyer from F. H. Hunt, of California, as pure honey. Analysis showed there was 75 per cent. or more glucose in it; but they found 75 per cent. Is there any man or woman in this room who wishes to pay honey price and buy glucose? Glucose does not harm any one, but does a person want to buy it? We have had a law enacted in regard to the adulteration of honey, and Mr. West will bear me out when I say that the department has been earnest in trying to prohibit the sale of this honey. The laws passed last winter were like all laws passed in a hurry. Mr. Hunt was furnishing a large part of the honey in this state. His honey is now in St. Paul; he is in California. He is beyond our reach. The law gives us no power to prosecute him, because he is out of our jurisdiction. If it allowed us to confiscate his honey, we would have him. His honey is in St. Paul, and we cannot take it. He is out of the way, and he will take very good care to stay out; and I hope every voice that will be raised here today to speak on this honey question will urge the passage of a law prohibiting the adulteration of foods in every particular, whether it is coffee, sugar or honey. The adulteration may be harmless. We have found coffee which has been gathered from boarding houses and hotels that is coffee grounds which have been dried, pulverized, mixed with rye flour and re-moulded in the shape of a coffee berry. This is sold to the retail merchants who mix it with good coffee and sell it; but I do not want any of it.

Mr. Taylor: I want to explain. If a pickpocket comes along and picks your pocket, are you not harmed? The position I have taken covers the whole ground of adulteration. I just asked that we be considerate. Now, in regard to the lady here. I presume she drinks tea. Now, I call it nasty, but I am entirely willing for you to be your own judge. I am the judge of my own taste.

Mr. Bertrand: I did not wish to be personal or hurt any one's feelings. If the gentleman meant the pocketbook and health also, adulteration could not be carried on without injuring one or the other.

THE ADVANTAGE OF THE HONEY BEE TO HORTICULTURE.

BY WM. URIE, MINNEAPOLIS.

Darwin's memorable researches and generalizations in relation to the fertilization and cross-fertilization of plants through the agency of insects are not the best of his many valuable scientific discoveries, nor, yet, are they the least, in their bearings on economic questions.

His classic investigations settled the question of the great value of insects in securing full fruitage to many of our most valuable fruits and vegetables. Since Darwin, many scientists have by crucial tests and experiments abundantly confirmed his conclusions. Our more intelligent practical men have also made significant observations. They note a scarcity of insect's visits to the blossoms of the first crop of red clover and, also, its failure to bear seed. The alsike clover is freely visited in early June by the honey bee and bears a full crop of seed.

In New Zealand the red clover failed to seed at all seasons and there was a conspicuous absence of insects upon the blossoms, both early and late. This led to the importation of bumble bees from England to the earth's very limit, and now the New Zealand farmers produce clover seed. Gardeners are keeping bees today that their vegetables may fruit and seed more liberally. Even the producers of flower seeds in our cities keep bees in their green-houses as they find this the easiest and cheapest method to secure that more perfect fertilization upon which their profits depends.

Secretary Farnsworth of the Ohio Horticultural Society could account for a very meagre crop of fruit a few years since in his vicinity, after a profusion of bloom, only through lack of pollenization. The bees had nearly all died off the previous winter. I have often noted the fact that, if we have rain and cold during the fruit bloom so that the bees cannot visit the bloom, there is a light crop of fruit or, perhaps, not any.

Darwin's researches considered insects as a whole, and it is true that all insects that visit flowers, either for nectar or pollen, do valuable service in the work of pollenization. Thus many of the hymenoptera, diptera and coleoptera, and not a few lepidoptera are our ready helpers as pollenizers.

Early in the season in our northern latitude most insects are scarce, the severe winters so thin their numbers that we find barely one where we find hundreds in late summer. Then the bumble bees and wasps number scores to each colony, while in spring only the fertile females are found. This is less conspicuously true of solitary insects, like most of our native bees and wasps: yet even these swarm in late summer, where they are solitary or scattering in early spring. The honey bees are a notable exception to this rule. They live over winter, so that even in early spring we may find ten or fifteen thousand or more in a single colony, in lieu of one solitary female as seen in the nests of wasps, hornets and bumble bees.

By actual count in time of fruit bloom in May, I have found the bees twenty to one of all other kinds of insects upon the flowers, and on cool days, which are very common in the spring in most locali-

ties, I have known hundreds of bees on fruit blossoms, while I could not find a single other insect. Thus we see that the honey bees are exceedingly important in the economy of vegetable growth and fruitage, especially of all such plants as blossom early in the season.

We have all noticed how much more common our flowers are in autumn than in springtime. In autumn we gather the aster and golden rod by armfuls. In May our flowers demand a search, while in California the fields in January and February are one sea of blossoms. The mild California winters do not kill the insects. There a profusion of bloom will receive service from the so-called marriage priests, and a profusion of seed will greet the coming spring time. Thus our climate acts upon the insect, and we understand why our peculiar flora has developed. Yet, notwithstanding the admirable demonstration of the great master, Darwin, and the observations and practice of a few of our intelligent, practical men, the great mass of our farmers are either ignorant or indifferent as to this matter, and so to the important practical considerations which wait upon it. This is very evident, as it appears from the fact that many legislators when called upon to pass laws to protect the bees, urge that fruit growers had interests as well as bee men, not seeming to know that one of the greatest of these interests rested with the very bees for which protection was asked.

If fruit growers and farmers understood the botanical structure of fruit blossoms thoroughly, they would recognize more readily the agency of bees in the fertilization of blossoms. Many of us are familiar with these things, but by far the greater number know or think little about them, and it is for the good of the latter class that I write this. If, for instance, we take the blossom of the cherry as an illustration, we find it is composed of the calyx or outer covering of the bud; immediately inside of this, comes the corolla with its several petals of white. Now, when this flower is opened and spread out in all its beauty and natural perfection before us, we notice in the center numerous small hair-like projections called stamens, and exactly in the center the pistil, which terminates in a small bulb at the bottom which is to become the fruit. Now, the numerous stamens produce pollen, which is inclosed in minute anthers at the head of the stamens and is the fertilizing matter which must be brought in contact with the stigma or top of the pistil. Thus the ovules or seed vessels are fertilized, or impregnated, and develop into perfect fruit.

One of the agencies for the proper distribution of pollen is the wind; but, sometimes, if we happen to have a few still days during the blossoming period, this would be inadequate to the designed purpose. So nature has placed a little drop of sweet deep down in in the flower at the base of the stamen, and our little friend, the bee, comes flitting about in search of nectar for his future winter stores, and discovering the tempting morsel he literally stands on his head in an effort to reach it, and in so doing his back becomes covered with pollen from the stamens, and as he reaches down into the flower his back is brought in direct contact with the pistil of the

flower, thus performing a very important work in nature's great plan. What bee-keeper has not noticed bees coming into their hives in the season of fruit bloom with their backs so covered with pollen from the flowers that they had the appearance of being a different race. Truly, there are wonderful things in nature, and it seems as though no individual can fail to see the agency of a higher power in the design of these things. Verily, all things work together for good to them that love good.

I believe the honey was placed in plants for the purpose of enticing the bees for fertilization purposes. To this end, I continue, we find honey or nectar secreted in such flowers as are incapable of self-fertilization; while those capable of being fertilized through the agency of the wind, etc., secrete no nectar to entice the bee. As an example, we see that wheat, oats, barley, corn and other kinds of grasses are capable of being fertilized by the rustling of their stalks by the gentle breeze, and none of these secrete honey, as all of you know, although there are a few who claim that bees secure honey from corn. Then there are all the clovers, all of the squash and others of the vine family, and buckwheat, none of which are capable of being fertilized through the process applicable to the first. All of these last named secrete honey for the sole purpose of enticing bees and other insects for fertilization so that they may mature seed that the species may be perpetuated. The same thing holds good with trees of all kinds. Hence, the claim put forth by some that the bees injure fruit by taking the nectar out of the blossoms is a false one.

Not many years ago, a few jealous persons in a certain township in Massachusetts banished bees from the town. The result was that little fruit was raised in the interior of that township, while all along the boundary fruit was as plentiful as ever. After this experience regarding their folly, they were glad to welcome the bees back again, when they again had fruit as formerly.

In some sections where bees are numerous, fruit growers are troubled at the season while packing fruit and naturally condemn the bees without stopping to reflect upon the advantage to be derived from them in fertilizing the trees and vines from which the fruit is taken.

In England a fruit grower was surprised to find that in one corner of his garden in which were placed colonies of bees, the trees were heavily laden with fruit, while those more remote had set very sparingly. Then he called to mind the circumstance of its being very dark and foggy during the blooming of the trees, so that the bees flew but a short distance from their hives.

The proprietor of a cherry orchard in California found that his trees did not bear remunerative crops after the fiat of the raisin growers banished the bees to a distant canon. Being convinced of the necessity of bees to fertilize the bloom, he procured some colonies, located them in his orchard, and then realized satisfactory returns.

Horticulturists and apiarists are like the American Union, one and inseparable.

DISCUSSION.

Mr. Pearce: Now, gentlemen, that is a very important paper. There has not a paper been read here today that is more important to the fruit grower and the farmer. Now, bees of every description seem to be the natural fertilizers of all plants and fruits, and the honey was especially put in the blossom for that purpose. You never see an apple crop when the weather is cloudy and rainy; then you never see any apples. But if the weather is bright, if it is warm, if it is clear, if all the bees and insects of every description are attracted to the flowers, everything will be fertilized; everything will be loaded with fruit. Now, it has been years and years since I destroyed a yellow jacket's nest or hornet's nest. I regard them as a sure indication of a good crop, if the weather is favorable. It is the universal custom to destroy these things. The first thing a farmer does when he finds a yellow jacket nest is to call his boys, and they destroy it. It is the worst thing he could do. Now, I have had the yellow hornets build their nests quite close to my house. Last summer we had one right above the door, as we went into the ice house and the milk house. We would go in day after day, and they never molested us at all. We went right in day after day, and they knew every one in the family. If a strange dog came around or a strange person, they knew it right away. The bees are the best friend of the farmer, the fruit grower and the gardener. They are a source of wealth, a source of satisfaction and one of the greatest luxuries of life.

Mr. Dartt: Mr. Chairman, I believe my friend Pearce has made a misstatement; and although his statement may be true, in some cases it is an exception. Now, he says the first thing a farmer does when he discovers a yellow jacket's nest is to go up to the house and call the boys, who go out and destroy it. Now, my observation and experience is different from that. I think the first thing he does is to scratch and run. (Laughter.)

Mr. Patten: This matter of fertilization to the fruit grower is certainly a very important one. While we have some varieties of the larger fruits that are self-fertile, like the Duchess apple, furnishing sufficient pollen, there are other varieties of the apple that have not this ability. We have in southern Iowa an orchardist who planted a number of years ago a block of some 140 Jonathan; they were topworked on the Tetofsky, but for twenty years that block has been unprofitable. Perhaps, if

this gentleman had had a colony of bees in that block the result might have been quite different. I do not know how this is. I do know the Jonathan and the Winesap as two examples that have been proved by long trial unfruitful by themselves; whereas, if placed close together in orchard form they each of them become fruitful; so that bees may become a very important factor to the orchardist, if he has a block of trees that are unfruitful. This should teach the orchardists this lesson, that it is better to plant several varieties near together.

INCREASING THE WHITE HONEY CROP AND FINDING A MARKET FOR IT.

BARNETT TAYLOR, FORESTVILLE.

How to increase the white honey crop, and then find a paying market for it, is the great question with bee-keepers. To make bee-keeping pay we must produce a crop of surplus white honey; anything but the best grades now go begging for buyers. I once contended that dark honey was as good as any, but I now respect the popular taste that demands clover or basswood honey for table use. There is but little excuse for having one-half or two-thirds of the crop in dark honey. I can get a larger crop of surplus now than ever before, under the same circumstances, and have it all white. But to do this one must have, first, plenty of bees, and have them at the first blooming of white clover, and then get the honey stored in the surplus department and not in the brood nest, and to know how to do this is the art of honey production.

To have the bees at the time needed we must employ stimulative feeding, and one of the chief advantages of the house apiary is that it gives a more perfect place for doing this than any other plan. In the house the bees are wintered on the same stands they occupied in the working season. At the approach of cold weather I surround the hives with a warm covering of dry sawdust; a feeder, constructed especially for the purpose, is placed on each hive and hive-feeder, and all covered with ten inches of sawdust. These feeders are so constructed that the bees can take the sugar syrup without leaving the warm cluster, and feeding can be done in any weather regardless of rain or cold.

When spring comes we remove the sawdust down to the top of the feeders which still leaves five inches of covering on the top of the hives to keep them warm and of even temperature on frosty nights and cold days. The entrance to the hive is left open in winter, the same as in summer, and the bees are at liberty to fly out whenever the weather is warm enough to invite them to do so. Covered warmly in their dry bed, with opportunity for an occasional cleansing flight, the bees will winter well and begin spring work full of health and vitality. As soon as the bees begin to bring in pollen in the spring, which is evidence that breeding has begun,

each colony should be fed a few ounces of syrup or dark honey each evening. Feeding late in the day prevents the excitement of day-time feeding and leaves the bees free to search the fields for nectar or pollen. And brood raising, once commenced, is never allowed to stop for wet or cold weather, and by the time clover blooms we will have giant swarms waiting for the harvest. At that time, or a little before, the sawdust packing should be removed from the hives, and each hive be given one or more supers, or sections. If working for comb honey, these supers should be at least half filled with sections containing finished combs saved from last year, and on which the comb leveler has been used to reduce all to a uniform size, and the honey in them will be equal in all respects to that built on thin foundation, and will sell in any market at the highest price.

We should fill the supers entirely with these combs, if we have a large enough supply; if not, a part of each super should be filled with sections with full sheets of thin foundation. When the bees swarm, the new swarm should be hived in a hive containing not more than 600 or 800 inches of comb space, and set on the stand previously occupied by the parent colony, which should be moved to a new stand, the supers being removed from the old to the new swarms, and others prepared like the first, to give plenty of room until the end of the white honey season.

By this management we secured last year more than 100 pounds per colony, in a season when bees managed in the old way generally yielded no surplus.

Now, friends, I have told you how to work to get big early swarms, and then we shall hear less about the failure of the honey crop. We can boast of our improved implements, but when it comes to getting an extra force of workers in season for the white honey harvest we are not much in advance of the bee-keepers of fifty years ago. Now, you need not doubt that all this can be successfully done in the out-yard; feeders can be packed on top of single hives by using an extra hive body or a cheap box to hold the sawdust, and keep the top of the hive warm so the bees will cluster up against the feeders. But the house is the cheapest and most perfect place in my opinion for breeding bees early in the spring and securing mammoth colonies in season to gather the white honey crop.

DISCUSSION.

Mr. Taylor: At the time I spoke of I had twelve colonies in the house. I did not use the house apiary, but a little apiary I was using at that time; it was not built for that purpose at all; but it is a fact that the bees wintered in there in better shape than they did in the house apiary.

Mr. Brackett: I am impressed with the value of bees as an agency for fertilizing fruit, but I would like to ask any one, does it really take too much time, so that it would not make it profitable to a man to spend his time caring for his bees? I just want to ask in a general way. I am impressed with the

value of bees and would like to know, but I do not want to take up too much of your time.

Mr. Taylor: I will answer that that depends upon circumstances. A person that has a taste for any thing can learn that thing so much easier than one who has not. If any one really desires to learn about bees that knowledge is easily obtained. I used to tell people when they talked about the great power some people possess about bees not stinging, that any one can learn that; it is only necessary to understand a few of the natural laws controlling this insect. Any child can learn that. About the time occupied in caring for them, that depends, of course, upon how many bees are kept. A man might keep but a few and get tired, but a few to make it interesting can be kept, with intelligence, without taking up very much time.

Mr. Crane: Does it not require a good deal of time to watch bees when swarming?

Mr. Taylor: Sometimes it is not necessary to watch at all, but when I make it a paying business and make my support, or living, from it, I watch them with the greatest possible watchfulness. During the time of swarming my bee yard is not left alone even during the time of taking dinner. Sometimes I run 200 colonies together, and only those who have had experience know what it is when the swarms are pouring out, twenty to twenty-five swarms a day, and under such circumstances I never leave it at all. A few swarms can be managed without all this trouble, but in the greatest honey years it requires great watchfulness; but any one can take a few swarms and set them out under a tree and carry on the business on the farm.

Mr. Jackins (?): I do not believe that those people, farmers, who are handling a few colonies of bees are making them pay expenses. It is a matter that is surrounded with a great amount of nice details, and, somehow, to make it pay one must be doubly interested and must be able to give a large portion of his own time to the matter. Our friend spoke about two colonies of bees; he wants them for a specific purpose, and I say get them by all means, if they are not in the neighborhood. I live up here right in the midst of the largest market garden district in the Northwest, and the more progressive of those market gardeners realize that they cannot get perfect results without bees. Now, get a few stands of bees and put them on your place; they will run themselves.

Mr. Urie: I have had an experience of over fifty years, and I am learning something new every year. As this gentleman

has said, 'let every one get a few swarms of bees and put them in his garden.

Mr. Timberlake: The great trouble with people keeping only a few colonies of bees is, that they expect those bees to take care of themselves. I know of several instances where they have begun and expected it to make a profitable business for them. One man had nineteen colonies in 1892 and made quite a little honey; he left them on the stands all winter, and he had one colony left in the spring, and he got a swarm from that. He said, 'If they will not take care of themselves, I will not take care of them.' If people get a few colonies of bees and expect them to take care of themselves, they will simply find themselves mistaken. Bees want to be looked after as well as any other business.

BEES IN RELATION TO FRUIT.

J. H. PANTON, M. A., PROF. OF BIOLOGY, ONTARIO AGRICULTURAL COLLEGE.

(Ontario Experiment Station.)

An act passed by the Ontario Legislature last session, referring to the prevention of spraying fruit trees while in bloom, has led to considerable discussion among fruit-growers and bee-keepers. The former feel that they should be permitted to spray whenever they desire, claiming that bees are not killed from visiting sprayed trees in search of nectar, and that this cry of alarm raised by bee-keepers is unfounded. Further, many are under the impression that bees injure ripe fruit, and that it is questionable whether bees are as useful in the fertilization of flowers as is claimed for them by their admirers.

The bee-keepers, on the other hand, maintain that bees are important in the fertilization of flowers and thus become necessary to fruit production; that they do not injure fruit, and that they are killed where trees are sprayed while in bloom. They go so far as to say that honey is affected where bees have been poisoned by Paris green.

In this somewhat confused state of affairs a bulletin bearing upon bees in relation to fruit should be of interest and practical benefit, now the following act (*passed April, 1892*) is about to be enforced:

1. No person in spraying or sprinkling fruit trees during the period within which such trees are in full bloom shall use or cause to be used any mixture containing Paris green or any other poisonous substance injurious to bees.

2. Any person contravening the provisions of this Act, shall on summary conviction thereof before a justice of the peace, be subject to a penalty of not less than \$1.00 or more than \$5.00 with or without costs of prosecution, and in case of a fine or a fine and costs being awarded and of the same not being upon conviction forthwith paid, the justice may commit the offender to the common jail, there to be imprisoned for any term not exceeding thirty days, unless the fine and costs are sooner paid.

3. This Act shall not come into force until the first day of January, 1893.

BEEES IN RELATION TO FERTILIZATION. During the process of fertilization the contents of the pollen grains become mingled with those of the ovules, after which the latter develop into seeds. This takes place somewhat as follows: The dust-like substance (pollen) on the ends of the stamens falls upon the top of the pistil. The outer coat of the pollen grain bursts and the inner pushes out in the form of a tube, which forces its way from the top of the pistil down through it until it reaches the ovary (the lower and enlarged part of the pistil) where the ovules are located. In the meantime a minute structure (germinal vesicle) has formed in the ovule. This point is reached by the pollen tube, an interchange of elements takes place, the ovule is fertilized and at once changes begin which end in the complete development of a seed.

The question naturally arises, How do the pollen grains get to the pistil? This effected, fertilization will in all likelihood take place.

Observation shows that this may be done in several ways.

1. *By the wind.* Where this is the usual way we find the plants are rich in pollen, have no nectar, grow crowded together, in some cases bloom before the leaves appear and are seldom attractive in appearance. The grasses, willows and some maples afford examples of plants largely dependent upon the wind for the transport of the pollen to the pistil.

2. *By artificial means.* Man can effect the same result by simply taking the pollen and placing it upon the pistil. This has enabled him to cross-breed and hybridize to such an extent that he has developed innumerable varieties of plants of great economic value, as is exemplified in our beautiful flowers and luscious fruits.

3. *By birds,* which to some extent aid in carrying pollen from plant to plant, especially such as the humming birds.

4. *By insects.* This, probably, is by far the most common method in nature, and may be viewed as the chief use of insects.

Plants fertilized by insects present an attractive appearance, are rich in perfume and, above all, supply nectar to the insects which frequent them. It can be readily seen how insects moving about in a flower will become loaded with the dust-like pollen, and in passing to other flowers aid much in transferring the pollen from one plant to another, and thus bring about a cross-fertilization, or, in other words, cross-breeding, which seems as essential to the production of vigorous and fertile plants as it does in animal life.

Among insects which aid largely in this interesting process no class is more useful than bees. Where imperfect fertilization has taken place fruit is incompletely developed in size and form, so that the quantity and quality are affected. Careful investigation has shown that the fruitfulness of many plants is largely influenced by bees and such insects as search for the nectar and pollen of flowers.

Although many flowers have both stamens and pistils in the same flower, still scientific observation has shown that even in these cross-fertilization is favored by the structure of the flower. From observations made it is claimed that orchards with beehives in them have been more fruitful than those without hives. In some cases bees

have been given access to greenhouses so that the flowers might be fertilized and thus develop more and better fruit under such conditions. Flowers have been covered so as to prevent insects reaching them, but light and air admitted. Side by side were others to which bees had access. An examination of the seed showed those of the former to be weak in vitality, those of the latter strong. In many instances it has been observed where fruit trees were covered with bloom and poor results followed, that the weather at the time of bloom was cloudy, wet and cold and thus unfavorable to bees working among the flowers.

Scientific investigation indicates more and more, as the question of fertilization is concerned, that bees are important factors in the production of fruit and thus become co-workers with fruit-growers.

BEEES IN RELATION TO THE DESTRUCTION OF FRUIT. Along this line of investigation exhaustive experiments have been carried on under the direction of the Department of Agriculture, U. S. Neither care nor expense was withheld by the apiculturist to whom the work was intrusted. Hives were kept within a building from which the bees could not escape. In this, grapes, peaches, pears and plums, varying from green to dead ripe, were placed. The bees were deprived of food and left with the fruit exposed, so that they might feed upon it when hunger affected them. Many came to the fruit from time to time but never broke the skin, but where they found it broken they at once fed upon the exuding juice. They showed no tendency to use their jaws in cutting open a place. The test was continued for thirty days, and other bees tried with similar results. In all cases food was taken only from fruit which had been previously broken. Consequently, it appears that bees will not injure perfect fruit, a conclusion arrived at by many observers before these thorough experiments were undertaken. This is what might be expected when the structure of the bee's mouth is considered. It is quite different in the case of wasps, which are supplied with jaws suitable to break into the skin, and in all likelihood they are the cause of the injured fruit upon which some observers have seen bees feeding. Much evidence has been collected upon the amount of injury done by bees to fruit, and it all seems to be in favor of exonerating the bee from the charge of injuring sound fruit.

PARIS GREEN IN RELATION TO BEES. In several places where spraying is carried on extensively it has been observed that since the introduction of that practice many bees have perished during the time trees are in bloom, and some observers have noticed that the brood also perished.

Before the days of spraying such mortality was unknown. Now although there has been no analysis of the bodies of the dead bees for the purpose of ascertaining the presence of arsenic, still the death of the bees is so intimately associated with spraying that there seems little reason to believe otherwise than that the bees have been poisoned by Paris green used in spraying fruit trees. However, this will likely soon be settled by an analysis of the bodies of bees supposed to have been poisoned, and I have no doubt arsenic will be

detected. I suggest the propriety of bee-keepers forwarding some specimen of poisoned bees to the chemist of the Agricultural College.

Prof. Cook of Michigan has proved by experiment that a solution of Paris green in the proportion of 1 pound to 200 gallons (a common mixture used in spraying trees) proved fatal to bees within 24 hours.

Regarding the effect upon honey there is considerable diversity of opinion. The writer is not aware of any experiments having as yet been undertaken to show that the honey is affected, though there is in the minds of some very practical men, such as the inspector, Mr. McEvoy, who is thoroughly convinced, a great fear that honey produced at the time of spraying is a dangerous article of food. The writer would suggest that some such suspicious honey be sent to the chemist already referred to so that there may be no longer any doubt regarding the subject.

Experiments in the laboratory and observations by practical men indicate that spraying trees in bloom with Paris green is followed by most disastrous results to bees in the neighborhood and, no doubt, some degree of injury to the trees as far as fruit is concerned.

THE TIME TO SPRAY. To spray when trees are in bloom is a great mistake, because it is a waste of material, time and fruit. The plum curculio and codling moth are the chief enemies we seek to destroy with Paris green. The adult of the former lays its eggs in the plum just beneath the skin and is not likely to be present to any great extent till the fruit is set, consequently applying the poison while the trees are in bloom is commencing the attack too soon. If thought necessary to attack insects before the time of bloom, spraying may be done and afterwards, but certainly *never while the trees are in flower*.

In the case of the codling moth, which deposits its eggs in the blossom end of the young apple, a mistake is also made by spraying before the fruit is set, which does not take place till the bloom is off.

The portion of the pistil upon which the pollen falls is exceedingly tender and sensitive, so much so that the application of such substances as Paris green injure it to so great an extent that the process of fertilization is affected and the development of fruit checked.

With these facts before us as revealed by scientific investigation, it does seem strange that any one should attempt to spray at a time not in accord with the teachings of science, and that any one should feel it a hardship to conform to the requirements of a law calculated to protect the interests of two so important classes as the producers of fruit and honey. Spraying is only in its infancy, but as time rolls on and this practice becomes more general, the practicability of the law referred to will become more evident and the efforts of those seeking to enforce it thoroughly appreciated.

Floriculture.

SOME HINTS ON FLOWERS THAT ALL CAN GROW.

A. N. KINSMAN, AUSTIN.

I have selected only a few from the many flowers that all can grow, and as the tide of popular favor has decidedly turned towards hardy flowers as the most useful, and as they are no doubt destined to become the flowers of the future, I will devote my time to those alone.

Among flowering shrubs we will mention the hardy hydrangea, (*Paniculata grandiflora*). It is perfectly hardy without protection and is very easily grown. It flowers in August when but few shrubs are in blossom and is much admired for its large clusters of handsome white flowers. It propagates very easily from layers and from hard or soft wood cuttings.

The syringa, or mock orange, as it is commonly called, is another well known and popular favorite. There are several varieties, but we will mention only one, the Garland syringa. It is very much prized for its highly scented white flowers, which are produced in such great numbers in June. It is occasionally injured in our severe winters, but quickly outgrows any set back it may receive.

Among the spireas, or meadow sweets, of which there are many varieties, we will select spirea Van Houtii, a strong growing, hardy shrub of handsome habit, that is covered in June with masses of large, white clusters. This is by far the best of the species. It is easily propagated by cuttings and divisions.

Golden spirea, or nine-bark, is a most graceful shrub, that with its golden green leaves and graceful form pleases every one by its contrast with the foliage of other plants. Where something nice is wanted as a single specimen plant for the lawn, it is especially desirable. The flowers are white and in clusters. It is grown from cuttings and layers.

Viburnum opulus, high bush cranberry, is a native shrub. It grows from four to ten feet high, flowers in white, flat clusters in June, followed by clusters of red or yellow fruit, which often hang on into winter. It is propagated by seeds, layers or cuttings.

Viburnum opulus sterilis, snow ball or Guelder rose, is a well known form of the high bush cranberry, with sterile white flowers in rounded clusters in June. This very popular shrub is grown from layers and cuttings.

Among the herbaceous flowers that are hardy, we will mention achillea, yarrow, or pearl. The flowers are of the purest white and closely resemble a pompon chrysanthemum. It blooms profusely from July until frost.

Aquilegia, columbine, is a well known pretty plant with flowers of many colors, varying from white to dark blue, and is very desirable.

Althea, hollyhock. These handsome and showy plants are well known and valuable. They should be slightly mulched for protection.

Dielytra, or bleeding heart, has graceful sprays of heart-shaped pink and white flowers, blooming in May or June. Foliage finely cut and very pretty. They soon grow to immense plants.

Helianthus, multiflorus or plenus. The flowers are from three to four inches in diameter, double as any double dahlia and very free blooming.

Iris, fleur de lis, German iris. There are several varieties, among the most desirable being Madame Chereau, white-edged and feathered violet.

Aurea, golden yellow, Princess of Wales, white atropurpurean; rich purple, very fine and early.

Perennial phlox. These fine, hardy plants are among the most satisfactory for clumps and borders. They are of dwarf, sturdy growth, perfectly hardy, and in late summer fairly cover themselves with immense pyramidal trusses of brilliant flowers, varying in color from pure white with rosy eye to red with beautiful markings; often six inches across.

Herbaceous pæonies. These very valuable plants are much neglected, and yet they are among our best hardy plants. Once planted they need no further care, and each succeeding year only adds to their beauty. The varieties commonly known are desirable, but the newer varieties produce very large, handsome, regularly formed blossoms, resembling large roses.

Among the hardy lilies I would mention two which are especially desirable, *lilium candidum*, with pure white flowers, and *lilium auratum*, or gold-banded lily of Japan, having large blossoms of white and gold.

There are many other hardy flowers that all can grow that I might mention, but as I do not wish to take up any more time at present we will leave the rest.

ROSE CULTURE.

MRS. I. ATWATER, MINNEAPOLIS.

(Read by Mrs. D. Morrison, at the last Summer Meeting).

It would be rank presumption in me to think that I could say anything to this society on the subject of rose culture that would be new or interesting. On the pages of your annals are inscribed papers from far more capable pens than mine, and giving the results of wider experience. But, if I understand rightly the business of your society, one of its functions is to encourage the general cultivation of flowers, making a specialty of roses, and to instruct the general public in the intelligent and successful treatment of them. I am often asked to explain my own methods of rose culture, and especially in regard to the continuous blooming of perpetual roses; and the hope that I may give some useful hints to inexperienced amateurs, is my excuse for trespassing on the time of your society.

In many gardens in this city, I have observed that perpetual roses do not blossom at all after the June period is over, or, if they do bloom, it is only at rare intervals and with inferior flowers. This ought not to be; perpetuals should bloom all through the sum-

mer and autumn, and will do so if properly treated. That mine never failed to yield this continual floral harvest, my old neighbors will all testify.

The causes of failure in this matter are various. One general cause is that such roses are treated like June, or annual, roses, while they require especial and much higher cultivation. The veriest tyro in farming can tell us the result to his corn or potato crop if the surface of the soil is merely scratched over sufficiently to keep down the weeds. It is exactly what happened to the roses under the care of the ordinary hired man.

In the first place, the roses are possibly not carefully planted. The soil should be mellow and thoroughly pulverized, and minute hand work should press it securely about all the tender roots, and ever after the soil should be kept in that condition—no skimming of the surface with the hoe, but at each stroke sinking it to the helve. This opens the pores of the soil, as one might say, and gives dew and water full effect. When I see a rose mound, with its finical, smooth surface, I feel sorry for the roses.

Another very common defect is the lack of pruning. I do not hold with some florists that roses, either annual or perpetual, should be very much pruned in the spring. Nature, at that season, is lavish of her bounties. Her teeming bosom yields its rich nutriment in limitless profusion, and there is no reason why the branches should not be left in their natural gracefulness and bear their fragrant and lovely blossoms even to their tips.

But, in the treatment of perpetuals, the knife should come in play as soon as the flowers are faded. New shoots should now appear from the roots, which will give the second period of bloom, and the old wood must be unsparingly cut back to produce another set of blooming stems, and this process repeated through the season. Some object that such treatment destroys the symmetry of the bushes. That may be, but the immutable fact remains—spare the knife, and you have no roses.

In regard to the method and amount of pruning, experience is the only real guide. It was my only teacher, and I found that different roses required different treatment. Those that send up continuously from the root strong shoots must have heroic treatment, while others of more delicate growth will thrive with less pruning. I usually cut back to eighteen inches, but sometimes, when the buds look weakly, to four inches.

Meanwhile, the new stems will have reached maturity and have begun to unfold their wealth of bloom. These, in their turn, must fall beneath the knife, except, as sometimes happens, strong lateral branches should develop, in which case the pruning process must be delayed.

All rose bushes have more or less weak and unproductive branches which should be cut out unsparingly at any season.

Under this discipline, my *Jaqueminots* used never to be without roses the season through and would be full of buds when frost came.

It follows, of course, that to produce such rich and continuous development the plant must receive corresponding nourishment. In fact, the soil for perpetuals can hardly be made too rich, too thoroughly and constantly cultivated, nor, in our hot dry weather, too abundantly watered. A few sprays from the hydrant dashed over the bushes night and morning are well enough as far as they go, but water to be effective should, in abundance, penetrate to the treasures of manure in the soil, thus forming the rich juices that the roots can drink up, and which gives them the power to produce such bounteous results.

The soil of my garden was a sandy loam to which in the rose beds was added a small amount of clay. The only manure used was well rotted horse manure, and as much of it was spaded in as could possibly be done. In this matter, a word of warning is necessary. A large amount of manure without plenty of water will do more harm than benefit. I should add that every week all the soap-suds from the laundry was put into the soil around the rosebushes. Hoeing was done on an average twice a week, sometimes oftener.

I give this simply as my own experience, and can only add that I cannot remember a day after I began to cultivate perpetuals according to this system that my bushes were without roses, from June to October.

My first Jaqueminot was an old fossil that came from the East, for which I paid seven dollars. It had one long big root, so destitute of rootlets that it looked as if it had grown in a plaster cast. I planted it from a sense of duty with not the faintest hope of its survival. During the summer a tiny shoot with a few poor leaves started from the stump; the next year produced several worthless stems, but in the spring of the third year great robust stems shot up from the root three or four feet in height and bore magnificent roses. I had the curiosity to dig down and examine the root and found that plenty of vigorous roots had sprung from the dry old one, and had stretched about in all directions, a fine testimony to the virtue of a rich mellow soil, and "the finest climate in the world."

Some June roses well repay careful and thorough cultivation. By cutting out the old wood, and all weak superfluous growth immediately after they are done blooming, the new shoots will grow taller and more vigorous. And if the soil is enriched and cultivated it will return ten-fold the next season in larger and more double flowers with increased depth of color.

Let any one try this method with the lovely Yellow Harrison, and after two seasons, it will hardly be recognized as the same rose.

The old White Province-Unique is a good subject for such experiments; the rose so dear to many of us from its associations with the Eastern home of our childhood, where its graceful loveliness shaded the homely porch, or twined over the lattice that surrounded the well curb, and its perfume filled the air with a fragrance never to be forgotten. A lady from the East gave me a scrubby little bush of it in '59, which was badly dried up from a long journey; but it recovered, and under good treatment grew to an amazing size, and was

the parent of many plants now flourishing in Minneapolis and other places. But few June roses pay for cultivation in these days of multiplied varieties of perpetuals, which with their continuous bloom are so much more satisfactory.

CHRYSANTHEMUM SEEDLINGS.

E. NAGEL, MINNEAPOLIS.

The interest in chrysanthemums is growing from year to year, and in the last fifteen years there has been a marvelous improvement in them, most of which has been accomplished by seedlings. As a general thing, the chrysanthemums are grown from cuttings; seedlings are grown mostly to get new varieties. A great many varieties have come from Japan, the home of the chrysanthemum, but of late years the seedlings produced in this country are fully as good, if not better, than those from any of the old countries; even the French and the English are not ahead any more in the production of new varieties from seed. Of late years, also, a great many of the large Eastern growers have gone into the growing of seedling chrysanthemums, and with the best results. Some of the best varieties from England and France are still imported, but at the late chrysanthemum show at the World's Fair, the seedlings originated in this country were the best.

For the last two years, we have been growing some seedlings and have had very good success. We have only grown them in small quantities, but have got a few varieties which compare well with our other best varieties and are hoping for still better kinds. I find it the most interesting work watching them grow and seeing them come into bloom, and always expecting something wonderful. Of course, it does not always come out that way, but the chances are there. To grow seedlings for cut flowers and plants for the trade, it is not profitable, for there are so many among them that are worthless. Seedlings are grown only to get the new varieties, and those that are good are propagated from cuttings, and in that way we can keep the stock from year to year.

As to growing the seedlings: In the first place it is necessary to get the very best of seed, which can be had of any of the large and reliable seed dealers in the East. Seed may be sown from the first of March to the first of April, and the plants will bloom the first year.

Sow in sandy loam in shallow boxes or seed pans; press the earth firm and even, and scatter the seeds evenly; then cover about one-sixteenth of an inch deep with fine sifted loam; water well with a fine sprinkler; keep seed in a temperature from 55° to 65°, and not let it get dry while germinating. When the seedlings are large enough to handle they should be pricked off in boxes similar to the seed boxes, and after growing two or three weeks should be potted off in two and one-half or three inch pots. Keep repotting so as not to let them get pot-bound, same as other chrysanthemums, and any florist that will try it will never regret it.

DISCUSSION.

A Lady: What do you use for a fertilizer ?

Mr. Nagel: We use rich soil in the summer, and a little before they set buds we use liquid manure, cow manure in water.

A Lady: They bloom about six months from the seed ?

Mr. Nagel: Not quite six months. They bloom the same time as the other chrysanthemums.

A Lady: How long does it take the seed to germinate ?

Mr. Nagel: About three weeks.

SHAPE OF GREENHOUSE ROOF.

JOHN NORDINE, LAKE CITY.

In regard to the question of the advantage and disadvantage of building a greenhouse with the short span to the south, I would say this, that in a greenhouse for growing roses for cut flowers, I would prefer the long span towards the south for two reasons: First, when the roses have grown to the height of between three or four feet, which they will do by the first of January, they will make too much shade for the plants which are placed on the broad bench that is always located on the broad span side of the greenhouse, and during the winter the sun never rises high enough to shine over the apex of the greenhouse; this will leave about one-fourth of the room in the house in the shade. The second reason I find is that a greenhouse with the short span towards the south does not need as much watering as another, consequently, the daily spraying of roses cannot be performed in such a house with as good advantage, and during cold weather there is more surface of glass covered with ice which shuts out the light that is so much needed during the dark part of the year. But, for a propagating house I should just as soon take one with the short span to the south, because in this house you will have no high plants to shade each other, and in this house you can more easily keep the low temperature which is required for the propagation of most of the plants; and you do not need to use as much water, because there is not as large surface of glass exposed to the sun.

In regard to heating there is little difference, although I am inclined to think it would require less heat in a house with the long span to the south.

State Fair.

THE HORTICULTURAL EXHIBIT AT THE MINNESOTA STATE FAIR, 1894.

The fruit and flower exhibit at this fair was probably the largest of its kind ever made on the grounds. The exhibit of fruit numbered somewhere near 2,000 plates and comprised the usual long list of varieties. This was an extraordinary showing for a year which was decidedly off with Minnesota horticulturists. The booth which was used for our exhibit at the World's Fair, an engraving of which is shown in the September *HORTICULTURIST*, was well filled with apples, grapes and canned fruits, and graced with many handsome flowers and decorative plants, which were generously contributed for that purpose by the florists exhibiting at the fair.

About 100 glass jars of fruit were shown, being the same that were on exhibition at the Columbian Exposition. They were in excellent condition, considering that they had been put up now two years. The refrigerator cases, intended to preserve and exhibit soft fruits in, were used on this occasion for the exhibit of bread and cake. They proved scarcely large enough for the extraordinary showing in this department. This exhibit of domestic stores attracted unusual and merited attention.

The three long tables in the center of the hall, with seven or nine shelves each, were filled with plates of fruit, with the exception of about one-third of the center table, which contained the ladies' exhibit of jellies and other pantry stores.

The show of grapes was of as good a quality as has ever been exhibited here, and probably much larger in quantity. A few plates of grapes of extraordinary size were shown, one bunch of Concord in the exhibit of Mr. H. L. Crane weighing the unusual figure of nineteen ounces.

While the apples were not as large or as highly colored as usual, and in this respect showed the effects of the peculiar season, the list of varieties was of about the usual size. The exhibit of plums was an extraordinary one, the best we recollect ever seeing in the hall. Considering the dryness of the season, much of the fruit was of remarkable size. Some very fine specimens of the Hawkeye attracted much attention, and also one plate of a Russian variety exhibited by Prof. Green was very noticeable.

The larger exhibitors of our society, Messrs. R. C. Keel, Wm. Somerville and J. S. Harris, were out in full force as usual. Others whose exhibits and presence there during most of the week added much to the interest of the occasion were Messrs. E. H. S. Dartt, Geo. Miller, O. M. Lord, Clarence Wedge, S. D. Richardson, Ditus Day, F. G. Gould, Dewain Cook, and a goodly number of lesser exhibitors who helped to swell the total result. Many excellent exhibits came from parties who were unable to be present. One of these was a notable exhibit of apples from Mr. Sidney Corp, of Hammond. Mr. J. S. Harris carried off the honors in the shape of first prize on collection of apples by a professional.

The tiers of shelves on either side of the hall flanking the fruit exhibit were well filled by a fine show of decorative and flowering plants from the greenhouses of Wessling & Hartman, John Vasatka and E. Nagel & Co., all well known Minneapolis florists.

Taken as a whole the half of the hall devoted to pomology and floriculture was a very attractive sight, and one lady who saw the horticultural exhibit at the World's Fair and this exhibit from the same point of view, that is, the balcony in our booth, declared that our hall was more attractive than the horticultural hall at the World's Fair. The exhibit was highly complimented in all directions, and was one of which our society may be justly proud.

The amount distributed among the fruit growers for premiums was about \$650, and for flowers about \$250.

It was the intention to publish a full list of the premiums awarded, but press of work at the State Fair office must postpone its preparation for the November number.

A list of the total of the awards to exhibitors in this department here follows:

Casper W. Ayers	\$1.00	A. W. Latham	57.00
Mrs. Belle Barton	36.00	O. M. Lord	14.50
Wm. Brimnell	1.50	Chas. Leudloff	29.50
A. A. Bost	8.50	Mrs. Wm. Lyons	18.00
Mrs. A. S. Babcock	12.00	Geo. Miller	23.00
Sidney Corp	31.50	E. Nagel & Co.	104.00
Dewain Cook	11.00	Wm. Oxford	31.00
H. L. Crane	22.50	W. L. Parker	21.00
L. E. Day	13.50	Wm. Somerville	40.00
Ditus Day	22.50	Alfred Sherlock	11.00
E. H. S. Dart	31.50	John Vasatka	59.00
M. M. Frisselle	2.00	R. Wessling	77.00
F. G. Gould	19.50	Clarence Wedge	8.50
John S. Harris	74.00	W. S. Widmoyer	2.00
R. C. Keel	86.00		
Rudolph Knapheide	28.00	Total	\$906.00

THE ASTER.—Perhaps, there is no flower that blooms from seed the first season and then dies that has received more care in its selection and cultivation than the aster. It is the special pet of the Germans, who have brought it to such perfection that from the best seed we very seldom get a semi-double flower. They have dwarfed it so that its blossoms lie flat on the ground, while other varieties grow two or three feet tall. Some have single stems, others are bunched like a tree; some varieties grow stocky and even withstand the wind without tying, like the Victoria and Rose.

Some of the pomponé varieties are small, no larger than one's thumb; while others, like the Washington, are three or four inches across. They have made the petals quilled, twisted and flat, curling up and down; they have produced spotted flowers, like the Harlequin, while in the crown aster, with large double flowers of all colors, the center of each is pure white. We get the Pæony Perfection in twenty-four different colors. There are thirty-six or more distinct varieties of asters, and each variety has from four to twenty-four distinct colors that can be bought separate. What a beautiful sight when in bloom to see all these kinds and colors growing in a field! The aster is especially distinguished from some of our coarse growing flowers by its slender wiry stem, giving in a bouquet or vase that graceful appearance that charms the flower lover's heart. It is also a beautiful flower for making designs.—*Amateur Gardening.*

Secretary's Corner.

The present paid annual membership roll for 1894 stands at 505.

Some seventy-five volumes of paper bound reports, etc., from this library are now at the printers being bound.

Be sure you call at the library when in the city, see what we have and get your share of the useful publications always on hand here for distribution.

The premiums of plants still due annual members for 1894 will not be sent till spring of 1895, unless specially ordered. Being mainly small fruits, the loss following their delivery this fall would be very general.

The notice of the next annual meeting, to be held Jan. 8th to 11th, 1895, will be printed in the January, 1895, number of the "Horticulturist," and not be sent out in a separate enclosure as heretofore. On this account this number will be sent out a little earlier than usual, about Dec. 20th, probably. Please take notice.

Is there any subject you would like to have discussed at the winter meeting, and any particular person you would like to have look it up? If so, please address the secretary at an early day, as the program for that meeting is now being made up. Send in any questions desired to be answered at that time to go into the "Question Box."

The following paid life members have been added to the list this year: J. R. Cummins, Washburn; E. E. Harris, La Crescent; and L. J. Gjemse, Hader. The first and second joined at the time of the last winter meeting, and the third on Sept. 19.

This roll should be larger, and undoubtedly will be in the near future. The Massachusetts society with a comparatively small annual list, has several hundred life members at a considerable higher rate than with us.

Arrangements have been made for printing what is called the "journal" of the society, that is, the record of the last annual meeting, including the officers reports, etc., apart from the magazine; but it is to be bound in with the twelve magazines at the close of the society year. The magazines make 480 pages and the record and index will make from fifty to seventy-five more, making in all an annual report much larger than any heretofore published by our society. It is the purpose to furnish a cloth bound copy of this volume to each member at the beginning of next year, with the understanding that the magazines received during the past year be distributed where they will do the most good.

THE MINNESOTA HORTICULTURIST.

VOL. 22

NOVEMBER, 1894.

NO. 10

Forestry.

OFFICERS OF THE MINNESOTA STATE FORESTRY ASSOCIATION, 1894.

John H. Stevens, *President*, - - - - Minneapolis
J. O. Barrett, *Secretary and Treasurer*, - - - Brown's Valley

Vice-Presidents, one from each congressional district.

First Congressional Dist.,	Wm. Somerville,	-	-	-	Viola
Second	" Alfred Terry,	-	-	-	Slayton
Third	" N. F. Brand,	-	-	-	Faribault
Fourth	" R. S. Mackintosh,	-	-	-	Langdon
Fifth	" S. M. Owen,	-	-	-	Minneapolis
Sixth	" Chas. E. Holt,	-	-	-	Duluth
Seventh	" O. A. Th. Solem,	-	-	-	Halstad

EXECUTIVE COMMITTEE.

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Wm. R. Dobbyn,	-	Minneapolis	C. L. Smith,	-	-	Minneapolis	
O. F. Brand,	-	-	Faribault.				

FORESTRY MANUAL.

J. O. Barrett, secretary of the State Forestry Association, has prepared and just issued a tenth edition of the "Forest Tree Planters' Manual," containing a great amount of information on that subject. A few of the articles it treats of are "Indigenous Trees and Shrubs," a very full list of the trees and shrubs found growing in the state, "How to Manage Forest Seeds, Seedlings and Cuttings," "Entomology," "Forest Reservation," "Forestal Irrigation," etc., etc.

This valuable work in paper cover may be secured of Mr. Barrett by addressing him at Brown's Valley, Minn., and enclosing four cents to pay postage. It should be in the hands of every one interested in this subject.

A. W. LATHAM, Sec'y.

TREES RECOMMENDED FOR GENERAL PLANTING IN MINNESOTA.

Box Elder (*Negundo aceroides*). Hardy, thick foliage, one of the "fittest;" ripens seed in the latter part of September.

Green Ash (*Fraxinus viridis*). Very hardy, fast grower, reliable.

White Willow (*Salix alba*). Pioneer in exposed places; valuable. Propagated from cuttings.

White Ash (*Fraxinus Americana*). Grows somewhat faster than the green ash, but is reliable; needs wet, low soil to do well. Ripens seed in October.

White Elm (*Ulmus Americana*). Rapid grower, hardy, long-lived; magnificent. Ripens seed in June.

White, or Soft, Maple (*Acer dasycarpum*). Rapid grower; liable to split down under strong wind; should be shortened at the laterals, retaining the central shoot; needs companionship of other trees. Seeds ripen in June.

Basswood (*Tilia Americana*). Honey-bee tree, valuable, beautiful; needs protection when young. Ripens seed in autumn.

Cottonwood (*Populus monilifera*). A very rapid grower, hence much sought; does well on deep moist soil, but not so reliable on the open prairie. Propagated from cuttings.

Silver, or White, Poplar (*Populus alba*). Hardy, rapid grower, fine grained. Propagated from cuttings.

Wild Black Cherry (*Prunus scrotina*). Hardy when grouped with other trees; graceful in form, rich in blossom and fruit.

Butternut (*Juglans cineria*). Quite hardy when protected while young; needs rich soil; valuable wood and nuts. Fall seed.

Black Walnut (*Juglans nigra*). Very valuable; adapted to southern half of the state.

Jack or Bear Oak (*Quercus banisteri*). Small, bushy, thick foliage; leaf persistent; excellent windbreak.

Burr Oak (*Q. macrocarpa*). Coarse, tough, trusty. Mix it in your forest.

White Oak (*Q. alba*). Slow grower, tenacious, most valuable.

Black Oak (*Q. tinctoria*). One of the loftiest trees of the forest.

Swamp White Oak (*Quercus bicolor*). Quite common in northern Minnesota in most all alluvial soils; vigorous, luxuriant; fine grain. When young its leaves are downy; in riper age they are silvery on the under side and bright green on the upper surface. It ranks with our lumbermen as the best of the oaks for toughness and durability. It grows to giant size; only give it a chance.

Tamarac (*Larix Americana*). Equal to if not better than the European larch. Grown from seed.

DECIDUOUS TREES FOR LAWN PLANTING.

White Elm, Soft Maple, Tamarac.

Hackberry (*Celtis occidentalis*). Hardy, beautiful. Ripens seed in autumn.

Laurel-Leaved Poplar (*Populus balsamifera*). Foliage thick and healthy; pretty, desirable. Propagated from cuttings.

Cut-Leaved Weeping Birch (*Betula alba* var. *laciniata pendula*). A variety of the European white birch; hardy in good soil and very attractive; pendulous.

Silver, or White, Birch (*Betula papyracia*). Conspicuous; needs moist soil to succeed well; pretty at all seasons.

Laurel-Leaved Willow (*Salix laurifolia*). Dark, shiny leaves rapid grower, close and pretty habit. Propagated from cuttings.

American Mountain Ash. Hardy, pretty, the European mountain ash excelling in some respects. Propagated from seed and ripening in autumn.

Wisconsin Weeping Willow (*Salix* var.). Fine, quick growing pendulous, beautiful. Grown from cuttings.

EVERGREENS.

White Pine (*Pinus strobus*). Most valuable and beautiful; long lived, hardy, adaptable to any soil; grown from seed that ripens in autumn.

White, or Blue, Spruce (*Picea alba*). Most valuable spruce we have; hardy when established; should be planted extensively. Grown from seeds.

Norway Spruce (*Picea excelsa*). Strong, fine grower, pyramidal in form, drooping habit, good windbreak. Grown from seeds.

Scotch Pine (*Pinus sylvestris*). Quick growing, coarse, heavy foliage, valuable and a pioneer. Grown from seeds.

Red, or Norway, Pine (*Pinus resinosa*). Rapid grower, pretty, long-lived, hardy when established. Grown from seeds.

Arbor Vitæ (*Thuja occidentalis*). Needs damp soil, but does well in any retentive soil when established; improves by cultivation; a pretty and useful hedge. Grown from seeds.

Red Cedar (*Juniperus Virginiana*). Very hardy, lives in spite of wind and drouth; valuable wood; an admirable windbreak.

There are other evergreens having promise of success for general planting, as tested by Prof. S. B. Green, such as the Colorado Blue Spruce (*Picea pungens*) and Bull Pine (*Pinus ponderosa*).

HARDY SHRUBS.

The following shrubs and vines are recommended by Prof. S. B. Green, horticulturist of the Experiment Station at St. Anthony Park, Minnesota.

Common Barberry (*Berberis vulgaris*). Strong, prickly, suitable for a small, loose hedge; yellow flowers in June; red fruit; very hardy. Other varieties are the Purple-Leaved and Thunborg's barberry. Grown from seeds that ripen in autumn.

Siberian Pea Tree (*Caragana arborescens*). Close, neat, locust-like leaves, and bright yellow, pea-shaped flowers; pretty; one of the hardiest. Grown from seeds that ripen in autumn.

Red Ohio Dogwood (*Cornus stolonifera*). Small, white flowers in June; bright red bark in winter; very hardy; pretty grouped with other shrubs. Grows easily from cuttings.

Weigelia (*Diervilla rosea*). Hardy, but needs protection in winter; rose-colored, trumpet-shaped flowers in June. Pretty.

Burning Bush or Spindle Tree (*Euonymus purpureus*). Naturally six to fourteen feet high, fruit a beautiful crimson; desirable. Grows from seed or green-wood cuttings.

Large-Flowered Hydrangea (*H. paniculata* var. *grandifolia*). Hardy, handsome; large clusters of white flowers in August; easily grown; clean and robust; must be well protected on the prairies in winter. Grows from soft wood cuttings or layers.

Bush Honeysuckle (*Lonicera Tartaricum*). Ornamental; large bushes, white and pink flowers. The *grandiflora* bears still larger pink flowers in June, followed by yellow and red berries; very desirable. Grown from soft wood cuttings and seed.

Garland Syringa (*Philadelphus coronarius*). Highly scented white flowers in June; needs protecting in the prairie country.

Spiraea or Nine Bark (*Physocarpus opulifolius*). Grows strong, six to ten feet high; clustered flowers in late June; makes good screens. Grown from cuttings and seed. The golden spiraea excels for its graceful form and golden-green leaves.

English Buckthorn (*Rhamnus catharticus*). A popular hedge plant of Europe and the Eastern States; bears close pruning without injury; robust, pretty white flowers in June; black berries; hardy, even in very severe localities. Grown from seed that ripen in autumn.

High Bush Cranberry (*Viburnum opulus*). Native, vigorous and hardy; grows from four to ten feet high; white flowers in June; clusters of yellow and red fruit hanging on into the winter; a pretty good substitute for cranberries. Grown from cuttings or layers.

Prickly Ash (*Zanthoxylum Americana*). Common, perfectly hardy; makes an impenetrable hedge. Grown from seed ripening in autumn.

Buffalo Berry (*Shepherdia argentea*). Give it a proper place, and it will grow from ten to fifteen feet high; found along the water courses of Dakota and Montana; bears imperfect flowers before the leaves appear; leaves are silvery and pretty; difficult to secure pistillate plants, but in some localities they are all pistillate, as on the banks of the upper Minnesota in South Dakota; hence, must have fertilization; fruit red, having one quite large seed; acid, makes a good jelly or sauce; hardy, and is used for hedges. Grown from seed.

Among other shrubs recommended are the Cinquefoil, Smooth and Cut-Leaved Sumac, Missouri Currant; Common, Red-Berried Cut-Leaved and Golden Elder; varieties of the Meadow Sweet Snowberry, Lilac, Snow Ball, etc.

VINES AND CLIMBING SHRUBS.

American Ivy (*Ampelopsis quinquefolia*). Native, strong, hardy; beautiful, bright crimson foliage in autumn. Surpasses all for unsightly fences. Needs liberal manuring. Grown from cuttings, layers and seeds.

Bittersweet (*Celastrus scandens*). Hardy, clean, conspicuous and pretty when covered with its orange-colored seed pods. Grown from seed or layers.

Virgin's Bower (*Clematis Virginiana*). Native, healthy and strong, bearing a profusion of small white, fragrant flowers in August. Makes a beautiful contrast with the ivy just mentioned. Grown from seeds or layers. The *C. viticella* is equally satisfactory, having large blue or purple flowers, producing them all summer.

Moonseed (*Menispermum Canadense*). Slender, and pretty, large leaves; succeeds well in partial shade; grown from seed.

Wild Grape (*Vitis riparia*). Coarse but beautiful, covering dead trees or any unsightly object. Hardy anywhere; fragrant flowers. Excellent stock for grafting with the domesticated grapes. Grown from cuttings or layers.

A VOICE OF WARNING FROM THE LUMBER SIDE.

Address delivered by Col. Platt B. Walker, a lumberman of Minneapolis, at the forestry session of the Horticultural Society, Jan. 11, 1894.

MR. CHAIRMAN AND GENTLEMEN OF THE SOCIETY: I accepted some weeks since an invitation from the president of the association to prepare a paper on the subject of "Forestry from the Lumberman's Standpoint," and I confess that had I anticipated my present feeble condition or my surroundings during the last two days I would have declined the invitation. I have prepared a brief paper which I will present to you and hope it may meet with your appreciation.

It is not the purpose of this article to enlighten this society upon the technic of forestry, as I profess a profound ignorance of the subject of tree planting, or concerning the adaptability and care of certain species in certain soils. These matters largely involve special education and experience, which I never have had.

First, as to the importance of the subject of forestry. The practical lumberman, who views this subject from a business standpoint, is, perhaps, the best posted individual concerning the growing scarcity of all the more useful woods of commerce. The importance of wood as a building material grows less and less, year by year, until we may look forward to the day in the near future when it will be abandoned altogether in favor of iron, brick, stone, terra cotta and other materials, which, under the improved conditions of manufacture, are growing cheaper year by year, until they have reached the point where they are almost as cheap as wood in the beginning, and almost imperishable in their nature. Poverty has compelled the beginner in the Western world to start life in the cheap pine houses and shops, and the flood of immigration to the treeless plains has made an extraordinary demand which has practically destroyed the available timber on nine-tenths the area of the Northwestern pine-producing states. The first and second generations of houses and shops from Maine to Oregon have been built of pine. It is not strange, therefore, that we can see the beginning of the end of this most valuable tree.

The destruction of forests in America during the century (especially the last half) is unparalleled in the world's history, both in its extent and in the ferocity of its slaughter. The bulk of the timber which adorned the country over, the Middle States in particular, was consigned to the flames to make way for the plow. This timber comprised a long list of varieties of useful and valuable woods. If the oak, walnut, cherry, ash and other woods which went to the log heap or into fence rails, were standing today in Ohio, Kentucky and Indiana, it would net enough to give a stone mansion to every farmer in those states. Be it said, in extenuation of this almost crime, that its perpetrators were not prophets and could not see that this world of timber could ever be utilized or would grow into enormous values for domestic as well as export purposes. The destruction of our pine forests has proceeded for the last quarter of a century at a rate that will soon deprive us of a supply of this timber. Eastern Michigan is practically denuded and relies on Canadian timber to run her mills, and the western half will soon be in the same condition, with no outside supply available for her mills. The Southern States have not, as yet, made such fearful inroads on their timber resources, but they are afflicted with the same mania for destroying which has characterized the Northern States. Another generation will complete the destruction of the invaluable timber supply which adorns that section of our country. They are offering every possible inducement to secure men and means from any part of the world to come and hew down their forests and carry away the proceeds. The difficulty seems to lie in the low valuation placed upon the timber. This, in the nature of things, will continue until we are compelled to resort to timber culture, as they have in Europe, for our supply. An ordinary lifetime is required to produce trees fit for commercial purposes, and it is very questionable whether any amount of time and labor could ever be made to produce our pine forests, the nature of the pine-producing sections being such as to almost preclude the possibility of attempting anything of the kind. The pine forests once destroyed are gone forever.

One of the strangest features of the destruction of pine is, that not the slightest effort, public or private, has ever been put forth to save these most valuable forests from destruction. The government seems to have regarded it as a useless burden and multiplied the means by which it could be gotten rid of, practically giving it away to the first applicant, generally without money or price. The bulk of these lands, in Wisconsin and Minnesota, at least, were given as a gratuity to half-breed Indians and soldiers, who peddled it away for pittances to lumbermen, who value it lightly, because it costs but a trifle. Such prodigality on the part of the government is, perhaps, the prime cause of the reckless waste and destruction as well as the low price of timber and lumber.

Among other reprehensible features of our American policy is, and has been, the encouragement of the wood export trade. Time will not permit me here to lay before you the figures showing the fabulous amount of timber which has been shipped to Europe from the United States since the early settlement of the Eastern States.

Could these figures be given, all would be astonished that any timber remains standing within our territorial limits east of the Rocky Mountains. Maine has been literally stripped of her magnificent endowment of pine, for which she has received comparatively nothing, and the work of clearing up remnants of her once boundless groves still goes on to supply a weak demand in Europe for wood pulp, staves and other small items of forest products. All along the Atlantic coast down to the Carolinas, the same condition exists, while the Gulf States and Michigan are exerting every possible effort to find a market for all their really fine woods in Europe. Michigan has furnished many hundreds of millions of pine deals, the best grade of pine timber, to Europe, and the denudation is still going on in that state as well as in northern Wisconsin to satisfy this demand. To such an extent has this gone on that Michigan has already been forced to resort to Canada for a supply of logs to keep her mills going, and they have received the privilege of securing this supply duty free. The time cannot be far distant when northern Wisconsin mills will be forced to the same course from the same cause. Canada for years has been drawing a supply of timber from Minnesota which approximates 200,000,000 feet per year, which they are permitted to cut and export without duty, most of which finds consumption in the Northwest territory. If the price realized for this exported timber was such as to justify the sacrifice of our last timber resources, it might be excusable, but it is disposed of in competition with that produced by cheap labor in northern Europe and other portions of the world, so that the cost of its preparation, deducted from its selling price, robs the timber of its standing value and hastens the approach of a timber famine in this country. The export of timber from Virginia, the Carolinas, Georgia, Florida, Louisiana and Texas, as well as the more valuable woods of the interior states, may be characterized as the most suicidal commerce in which a nation ever indulged. What can or ought to be done by the nation, state or your association to arrest this destruction are matters which call for the exercise of the greatest wisdom, and it is of such importance as to justify any and all possible efforts.

Coming down to the question of trying to secure aid from either state or nation in any way to establish a system of forest raising, I am free to confess the obstacle, at least, seems to be insurmountable. The experiment tried, a few years ago, of giving away prairie land free to those who would cultivate trees on a small portion of it, proved such a failure that it will never be repeated; and, looking further into the subject, it would be folly to expect county and town aid for the purpose or, still further, to ask individuals to contribute to stocking somebody else's land with trees by contribution of any sort. Practically, we have nothing left but to urge upon the owners of land the propriety or necessity of setting apart a portion of his land for the purpose, and systematically engaging in raising trees. If one forty out of each one hundred and sixty acres were devoted to this purpose, in the course of fifteen or twenty years some return would begin, and, carefully husbanded, a perpetual supply of fuel would be found in every part. The influence which such a system

of forestry would have upon the health, comfort and wealth of this country cannot be measured. Some effort to replace the destroyed forests will, in the not distant future, become a necessity, but how it will be accomplished time alone can tell.

It is to be remembered that recently the government has undertaken to preserve for the future use, under proper restrictions, large areas of timber lands which are, as yet, in the virgin state. A list has been furnished by the department, showing the aggregate to be over 17,000,000 acres, divided as follows in the different states and territories:

Alaska.....	1,851,520	New Mexico.....	311,040
Arizona.....	355,520	Oregon.....	4,653,440
California.....	6,238,729	Washington.....	967,680
Colorado.....	3,101,360	Wyoming.....	1,239,040

How far this policy should be extended to other states, would seem proper for discussion by such bodies as yours. The great Red Lake reservation, of northern Minnesota, as well as other smaller reserves, which are soon to be placed upon the market under existing laws, might be added to the forest reserve; otherwise, they must soon fall before the savage attacks of the energetic lumbermen of our state, assisted by those of Canada. By this means four billion feet of timber might be preserved for future use. Should you undertake to secure legislation to this end, you would encounter serious obstruction, both in this state and Canada, as well; for it is a fact that the Canadians, who have cut thousand of millions on the northern slope of the state, have had resident side partners who were potent powers in state and national legislation, to open and smooth the way of the Canadian lumbermen in Minnesota.

The appalling magnitude of the destruction of timber in the Northwest will, perhaps, be made plainer to you by giving the lumber statistics of the cut of white pine in the Northwest for 1892, saying nothing of the enormous hardwood cut. The number of feet is as follows:

On Mississippi, above Minneapolis.....	109,863,378
At Minneapolis.....	488,724,624
On main river between Minneapolis and St. Louis....	931,806,305
On St. Croix river.....	175,891,427
On Black river.....	240,678,500
In Chippewa valley.....	298,833,782
In Duluth district.....	349,394,000
St. Paul & Duluth railway.....	73,955,000
Ashland district.....	273,229,877
St. Paul & Omaha railway.....	286,311,383
Wisconsin Central railway.....	301,806,875
In Wisconsin valley.....	456,153,872
Sault Ste. Marie railway.....	293,565,541
In Red River valley (estimated).....	100,000,000
Taken to Canada, (N. W.).....	150,000,000

Total.....4,530,215,565

Gentlemen, from these figures it is apparent that the field open before you is wide, and its cultivation demands all your energy and wisdom. If you can accomplish the objects of your association and

establish a wise and enduring system of afforestestizing our prairies and denuded forest lands, you will be entitled to and receive the thanks of all future generations of Americans. In this work, I bid you God speed.

RATIONAL FORESTRY.

Delivered at the Annual Meeting of the Minnesota State Forestry Association, Minneapolis, Minn., Jan. 11, 1894.

Hon. O. S. Whitmore, editor of "Hardwood," Chicago, being introduced, made the following remarks preliminary to reading his paper:

MR. CHAIRMAN, LADIES AND GENTLEMEN:—I appreciate the honor of being with you tonight to read a paper on "Practical Forestry," and while here with you, and knowing the great interest that seems to be awakened on the subject, I would like, before reading my paper, to make a few preliminary remarks with regard to forestry as exemplified at the World's Fair and the lessons taught by it, if you will allow me to take up a few moments time. I had the honor of being on the jury of awards, and devoted about sixty days to the forestry department, and had a chance to study very thoroughly, not only in the native exhibits, but in the foreign exhibits; and we have to congratulate the state of Minnesota on its exhibit and the manner in which it was presented there, and the manner in which the educational features were brought out and exemplified every day, and the earnest work which your secretary did there while in charge of the exhibit. It was certainly in one way the most unique forestry exhibit in the building, and I am proud to say that the awards you received for Minnesota were handsomely earned. In explanation of the fact that Michigan received twenty-one medals and Minnesota a less number, I would like to say here that it was simply owing to the manner in which the exhibit was entered for award. Michigan was entered as a group exhibit in the name of the state commission simply for one award, then the exhibit was divided up and entered separately in the name of the different competitors, and each one entered his own exhibit as a special exhibit, not as competing for an award; thus their awards were divided; but your exhibit was entered there as a whole under three or four heads only, and not by individual exhibitors; hence, the difference in the number of awards. I wish to explain further that the value of the awards depended upon the points of excellence which were mentioned in the

committee's report, and, whereas, many of these individual exhibitors from the different states and foreign nations got a medal, your state had a list of points of excellence that exceeded those of any other one state or nation that entered into competition for an award. (Applause.) It was a great pleasure to my department, and it was a great pleasure to me to write the committee's report and to make the award. I mention this simply as due to the state to know why the award stood as it did.

The time is rapidly approaching when rational forestry must command the attention of every lover of his country, but before that time arrives there must be a better knowledge disseminated as to what the science of forestry really means, or, perhaps, what is more important, what it does not mean. The proper idea has apparently been that it consists of two propositions: First, the suspension of further cutting of the forests of the country, as far as possible to do so, by congressional or legislative action, and by moral forces; second, the indiscriminate planting of trees, with the half-formed idea that in some way or somehow this will pay in the dim future.

It must further be taught that the Creator did not cloth the earth with forests from any mere sentimental or æsthetic motive, but for the good of His creatures who were to inhabit it to the end of time; therefore, that the forests are grown to be cut for the benefit of mankind, for fuel with which to cook his food and to warm him in winter, and for lumber with which to build a shelter over his head. These are the actual necessities of humanity if it would be in any degree above a savage; if man would not continue to eat his food raw, dress in skins or woven grass and dwell in caves.

These wants of the human animal mark the first step in mental and moral development. The next step, the production of food other than the wild game of the forest, pre-supposes the cultivation of vegetable products suitable for his nourishment. This cannot be done in the uncut forests; and as man's first wants compel his living in a wooded area, he must destroy a portion of the forest that the ground it occupied might be turned into fields, and ultimately into pastures for tamed beasts suitable for food, as the dependence upon wild game became more precarious and the chase irksome; his development carrying this point further to include domesticated beasts of burden.

Had man been content to go down the ages satisfied with the gratification of these simple wants, the inroads upon the forests, even to this day, would be small. But the Great Designer of his destiny decreed otherwise. It was necessary to man's perfect development that the finer, the æsthetic part of his nature should be cultivated. This demanded something better than a hut of bark or logs. With this demand came the one for better tools than were found in the stone ax and the saw of shark's teeth. The metals lay in the earth at his feet. But to utilize them required the further destruction of the forest to feed the smelting furnace and the forge. The development of

the human race, beginning slowly, increased rapidly for a time, then ebbed almost back to barbarism, again flowing forward, sometimes almost stationary, but always forward to the culmination of the nineteenth century and the year of the White City. The log cabin gave place to the cottage, the cottage to the mansion and palace. The step from Lobengula in his grass hut in the wilds of Africa to the White House and lofty dome of the capitol at Washington, is a long one, reaching over centuries, but it covers the story. The forest trail gave place to a bridle path, the path to a road, the ford to a bridge; the canoe and paddle gave place to the ship with sails, and finally the apotheosis of progress came with the modern railway and the Atlantic steamship.

Each step upward in the human scale has made its demands upon the timbered area. In all ages the husbandman has been the great destroyer of the forest, and logically so. He has ever been the pioneer. He must first advance into the wilderness and create a demand for a town as a market center, and a demand for lines of transportation. The city is born of the wants of a given territory. Primarily, the settler has cut down the forest, first, to make a shelter for himself and family and his various belongings, and, secondarily, to make room for fields and pastures. Incidentally, some portion of the fallen timber has been utilized for economic purposes outside his immediate wants; it has gone to build the town that has grown up behind him, to build ships, railways, bridges and vehicles of transportation, and for fuel for towns and manufacturing.

Speaking specifically of our own country, it is only within little more than half a century that lumbering as a special industry has begun to destroy the forest simply for the sake of merchandising its products; but that half century has wrought such violent changes in the states where lumbering as a special business has been followed, that it has roused the thoughtful to ask the question: What will the end be if the present destruction continues with no attempt made to modify its wastefulness? That there has been wastefulness by lumbermen and farmers is beyond question. But the past is behind us; we may deplore its extravagance, but we must admit there are extenuating circumstances. Artificial wants of modern civilization often made the farmer settler extravagant in his treatment of his woodland, while the professional lumberman has been impelled to the same thing by the necessity of making a profit from his operations. The enormous demand for lumber from non-lumbering sections has forced the production, while costly transportation to market has obliged him to leave all the coarser and low-valued products unutilized, not more than 20 per cent. of actual bulk of the forest growth ever producing any profitable return.

It is a fact that only quite recently has science discovered the means of utilizing forest waste by converting it into by-products of great value in small bulk, thus overcoming the problem of transportation to market at a profit. Until recently the only use of lumbering waste has been to convert it into small completely finished articles of every day use, and this could only be done in the older

portions of the country, where the market was contiguous, transportation charges small, and lumbering carried on on a small scale. But today there is less excuse for waste. Nevertheless, all discussion of rational forestry must begin with the proposition, which is akin to an axiom, that forests were given by the Almighty to be cut for man's benefit, and that lumbering is a business for profit as much as raising wheat or cotton. It must also be granted that the owner of a tract of forest land in fee simple has as much legal right to harvest his crop of trees as the owner of a cultivated farm has to harvest his crop of corn when it becomes ripe in the fall. The state, having once granted the fee to land, cannot control the usufruct except by enactment in the original deed of conveyance, which must be understood and assented to by the grantee. But methods of usufruct can and should be controlled by the state. Our hurried, feverish national growth has caused this point to be greatly overlooked. Should the state act upon it at once, the further destruction of forests by fire could be practically prevented. To accomplish this should be work for practical, rational forestry.

Such points can only be barely suggested in this paper, but they include all methods of both lumberman and pioneer farmer which in any manner imperil the interests of others; while, outside of the mere legal questions, there are great moral obligations relating to the general welfare of the commonwealth, which must be discussed by forestry advocates, and up to which all classes must be educated. And these moral obligations relate not only to the present, but to the generations yet to come. Methods that affect climatic conditions, the water supply, destruction of navigable waterways by producing arid conditions; all these may be legal or simply moral questions. It is the legitimate province of rational forestry to determine this by careful discussion and examination, and, having done so, to pursue the remedy.

This is a utilitarian age; man works for the profit there is in it. The most rational part of rational forestry relating to existing forests as to convince the owner of a forest, be he lumberman or farmer, that it is for his interest to improve upon his present methods of treating it. When he shall be made to see plainly that it will pay him and his children to handle his timber as a periodical crop, to be preserved with care, to be cultivated in a certain sense, to be protected from everything that might endanger it, as he would protect his cornfield from weeds and insects; then will rational forestry have performed its greatest mission. The work of that branch relating to the mere planting of trees and the reforestation of denuded acres is play in comparison.

DISCUSSION.

Mr. Dartt: I think it is nice to imitate the honey bee, that is said to be able to draw sweets from almost all of its surroundings. I have one little bit of comfort in this great calamity that is befalling us. The first gentleman told us that the tide of invention was setting in to such an extent that when this

calamity should about overtake us we would be ready to leap out on the score of modern inventions coming to our rescue to such an extent that we would be able to do without timber. I fell inclined to hang on to that bit of comfort and make the most of it. If that calamity does come, it will bring with it inventions that will help us to get along very comfortably without timber. When that time does come, there will be advantages that we do not estimate now. There will be no danger of fires. Those terrible holocausts that have been and are taking place with our present wooden structures, where hundreds of lives are lost, will be things of the past. There will be a great many ways in which we can slip along without borrowing trouble from this calamity side of the question. We will admit everything, but we will look ahead and try to slip out without suffering.

Mr. J. A. Sampson: I am glad that our friend Dartt has suggested the idea of inventions. I would also refer to the paper that was read wherein it mentioned the materials that are coming to take the place of wood. I would suggest that the manufacture of wood pulp be encouraged as far as possible, and it would save timber in a large way.

Mr. Ayers: There is another point touched upon several times this evening, and to which I am opposed, and that is that forests have no effect on the climate. It is very easy to get along and let those things follow their course, but it is not my doctrine. I believe the Creator has placed troubles in our way which he wants us to overcome, and he rewards us by making us more prosperous. In regard to the climate, we have no data or any records that were kept in the United States that show anything either way on the question. In Prussia and France records have been kept, and it is found that in the woods, especially in the summer time, the air is much nearer the point of saturation (the point near which rain is precipitated) than it is on the prairie; about nine per cent. greater. When the wind blows over the forest it is near the point of precipitation. When such an air comes along almost saturated with moisture that is thrown out by those leaves of trees, we get rain. [I have talked with about a dozen people who live in Dakota, and they have seen it rain in the timber when they had not a drop of rain where they lived. I believe rain often falls in that way.] Even if it does not, we can see that that belt of timber by giving out its moisture to the air and protecting it

against the winds will to a certain degree protect the country lying to the leeward of it; that country so sheltered will not dry out so much.

There is another experiment that has been tried as to the actual amount of rainfall, as between the forest or open prairie, near Nancy, France. There was a decided difference. It was found that during the spring there was 13 per cent., 23 per cent. in August and 21 per cent. in October more rainfall in the woods than there was in the exposed country. I know of no reason why we should doubt this; everything seems to accord with common sense and reason. We have heard the statement made here that the amount of rainfall in Minnesota has not changed since the country was opened for settlement, and that the destruction of the woods has no effect on the rainfall. The gentleman who made that statement did not stop to think of the thousands of acres that have been put under cultivation. Now, we have acres and acres of grain that sends down its roots to the water and brings it up to the air, and that to some extent certainly compensates us for the loss of our forests about us.

Mr. Dartt: When I settled in Wisconsin a good many years ago the fires ran all over that country. When the fires stopped new growths sprung up, and twenty years afterwards there was more growth there than when it was first settled. There is this about it, when that good time comes when we shall need no timber for building purpose, we can save all of our trees together and thus save the moisture, and now I think that is a sufficient reason why we should not be very much alarmed.

Mr. P. B. Walker: It had occurred to me to supplement my paper with a few remarks, but perhaps there has been enough said on the subject. (Cries of "Go on," "Go on.") I think it is perfectly safe to say that I have had the largest experience west of the Mississippi River of any man in this room. I have spent over half a century west of the Mississippi. My early youth was spent in western Missouri, and during my boyhood with my father in journeying over the treeless plains of Kansas, Nebraska, western Missouri, Indian Territory and Texas. I grew up in that country, and in my earlier manhood it was my fortune to roam nearly over all the country lying between northern Iowa and the chaparral country of Texas, and even beyond that. After I grew up to manhood, I traveled over the same plains I had traveled over first when a boy with my

father, and until up in the sixties I continued to travel over that country; and looking back over the years that have passed, I am greatly encouraged in the matter of forestry, and I am happy to be able to say to you that from my own personal observation between here and the Gulf of Mexico, there are more than a thousand trees growing now where there was one growing when my father first took me over that country. It is impossible to determine what the original country was, whether wood or prairie.

I have during the last fifteen years visited portions of southern Kansas and the Indian Territory where my father herded large herds of cattle, and where there was not a tree in sight from our tent door, and now you could not tell, looking in any direction, what there was originally, timber or prairie. This is true, that all that country from the chaparral country of Texas to Kansas today has more than a thousand acres of timber where it had one when I was a boy. The same almost is true of Nebraska. In northern Texas there are great plains reaching many miles from streams, that were originally the herding grounds of cattle; today they are simply forests. Looking from our log cabin where I spent my boyhood on the bottoms of the Missouri River, there was not a tree standing, except some that had been standing when we took possession of that plantation. My father planted some trees here; he planted a large number of cottonwoods and other trees native to that country. I planted trees there when a boy on that old prairie farm. Thirty-five years later I went back. The old cabin had disappeared; there were traces of the old well and the foundation of the chimney, but all around there were magnificent trees as big as my body, and you could not tell, looking as far as the eye could reach over the prairies, we could not tell whether it had been a prairie or timber country. The same is true of all the country, and it seems to me that all this timber was created for the wants of man, for fuel and for shelter, and that a good Father stands ready and has already provided by the laws he has established to give it to us.

It occurred to me to make these suggestions in view of the discussion we have had here, and I trust I have not been considered as intruding myself upon the society. [Applause].

THE BILTMORE FOREST SYSTEM.

The first practical application of forest management in the United States has been initiated in North Carolina, known as the Biltmore estate, owned by George W. Vanderbilt and superintended by Gifford Pinchot. It covers 7,282 acres. An illustrated exhibit of it occupied a prominent position at the Columbian Exposition in the forestry building. Mr. Pinchot is a well posted forester and understands what he is about. His report of the first year's work, commenced May 1, 1893, on this estate is very creditable. It gives an elaborate description of the locality on the French Broad river in the western part of that state, its configuration, its geological deposits, its meteorological peculiarities, its natural species of trees, its injured-forest condition, arising from haphazard cutting of the better trees, frequent fires and the browsing of cattle. Mr. Pinchot says that "at the time when the forest management was begun on the estate, the condition of a large part of the forest was deplorable in the extreme."

By cutting such trees as was necessary to begin the improvement amid the widespread chaos, and selling the same for lumber, cord wood and railroad ties, there was realized a balance, net, of \$392.40, the first year. It is presumptive that with judicious and economic management, the profits will augment from year to year, and instead of raiding the forest for money considerations, it is fitting it to be a profit investment for all the years to come.

A nursery has been established on the estate, already containing more kinds of trees and shrubs than there are in the botanical gardens at Kew, near London, and the number is being steadily increased. It is the intention to plant these along the line of a road to be called the "Arboretum Drive." This road, about five miles in length, will run through some of the most beautiful portions of the estate, and will be lined for a hundred feet on either side by the plants of the collections, making this arboretum the finest in existence.

The reader will note with what prudence Mr. Pinchot proceeds in the start. He found the "old spreading trees were seriously injuring the young growth below them, and it was impossible to found a system of management on the lives of the older specimens, which, in many cases, were already perishing. It became necessary, therefore, to institute a series of improvement cuttings which should remove these older trees, and prepare the way for a working plan under the 'Regular High Forest System,' the characteristic of which is that the trees of the same age are grouped together, so that there are (theoretically) as many separate groups as there are years in the age of the oldest trees."

He found two limitations imposed themselves at once. "No older trees could be cut where the young crop was very far from being dense enough to protect the soil, and no cuttings could be made which would cost more than the value of the product. The term of six years was tentatively set for carrying out these cuttings and the inaugurating of the working plan. It was almost impossible to set

a shorter period, for the reason that in many cases all the old trees could not be cut at once, on account of damage to the future crop; and, for the same reason, not less than five years intervene between the first and second cuttings on the same ground.

"So far as can be judged at this early date, the improvement cuttings seem to have accomplished what was expected of them. The appearance of the forest where they have passed is much improved, and the young trees which have been set free are doing well. But, although it is too early to pronounce definitely upon all of their effects, two facts seem to have been established. These are, that large trees surrounded by a dense growth of smaller ones may be felled and removed with comparatively very unimportant injury to the young crop, and that the additional cost of the necessary care, beyond that of ordinary destructive lumbering, is so small as to be out of all proportion to the result. If this latter fact should be established later on in other parts of the United States, as there seems little reason to doubt that it will be, its importance to the future success of forestry will be very great. Its value in practice is enormous."

Under the Biltmore system the working plan is made elastic. Its general objects are three in number: 1. For profitable production, giving the forest direct utility. 2. A nearly constant annual yield which gives a steady occupation to a trained force under a permanent organization, and makes regular operations possible. 3. Improvement in the present condition of the forest.

"These general objects are to be attained by means of two systems of management. On the east side of the French Broad the 'Regular High Forest System' will be adopted, and the 'Selection System' on the west side. In each case the rotation, or the length of time in which a second crop becomes ripe on the same ground after the removal of the first, was fixed at 150 years. In a theoretically perfect forest, under the 'Regular High Forest System,' there would be as many sub-divisions as there were years in the rotation. The trees of each sub-division would be of equal age and would differ from those of the next sub-division by one year. In the present case, for instance, the oldest sub-division, bearing trees 150 years of age, would be ready for the ax; and the cutting, after passing over it and then over all the others in succession, would reach it again at the end of 150 years."

"The 'Selection Forest' in its perfect state has trees of all ages mixed together everywhere, instead of being separated into groups of uniform age. The annual yield is taken each year from all parts of the forest. But under such a method transportation would manifestly be too costly for American conditions; consequently, the 'Localized Selection System' was adopted in its place. Under it the annual yield comes from a restricted portion during several years; then from another portion during a like period, and so on, until the cutting has passed over the whole forest. In the present case the yield will come from one-fifth of the area during each period of five years. Consequently, the cutting will return over the same land once in twenty-five years."

The object in making the Biltmore case so conspicuous in this report is to show that order can be instituted in the forests of Minnesota, where the conditions are similar. The assurances of success are at least 50 per cent. ahead of the venture in North Carolina. Our lumber territory, our transportation by water and rail, our mill facilities, our lumber and fuel markets, are superior in every particular. We have at least a hundred-fold more raw material to utilize than North Carolina or any other southern forested state.

What hinders Minnesota, then, from undertaking to commence a forest improvement system, not exactly after the pattern of Biltmore, but as our privilege warrants for business enterprise? We have no time to brood over the ruined condition of our forests, nor to berate any one for producing those conditions. Let us accept the situation and see if we cannot make it pay to bring order out of chaos.

We cannot reasonably anticipate that lumbermen will pause in their work to consider experimental methods, or turn back to reconstruct where forest injury has been wrought. Even if they were convinced that scientific forestry is the most profitably economic in the long run, it is questionable whether they would or could consistently accept the new responsibilities. Their investments, their chances to compete for the mastery, their lumbering shipments, positively forbid any departure from the lines they are pursuing, as viewed from the pending business standpoint. We must be content with the facts that, really, they are friends of scientific forestry, and do countenance the object we have in view, but are not ready to adopt it.

Need the matter in hand be viewed as merely experimental? Germany, France and other European nationalities have demonstrated that scientific forestry pays among the millions to the state, to say nothing of the agricultural advantages accruing therefrom. Minnesota owns vast tracks of swamp lands, raided by thieves, subject to annual fires that seriously injure the soil; lands which, after the timber is cleared, remain idle, weary and desolate. Is it not practical economy to make them pay something to the state by enhancing their value for sale in the future or, better, by keeping them as reserves in trust and under constant improvement for the benefit of our successors?

Prof. S. B. Green suggests the feasibility of utilizing a large tract, a whole township, perhaps, of the university lands as a branch experimental station in the northern part of the state, located among the lakes there and protected by the native trees. The chances certainly are excellent. Under proper management it would more than pay for itself, and be of immeasurable benefit to the state. It is ardently hoped that our regents will give the suggestion the deliberate attention it deserves.

THE FORESTRY SITUATION OF TODAY.

J. O. BARRETT, SECY.

Delivered before the joint session of the Forestry Association with the Horticultural Society, Jan. 11, 1894.

Never in the history of the forestry movement in Minnesota was it in so promising a position as now. The opposition has largely lulled down, at least to consent, and inquiry is everywhere made respecting the best methods of promoting, not only tree culture, but tree preservation, against wanton depredation and fire. Let us not pride ourselves as having gained this impetus by our own efforts alone, as a distinct organization. But for what the fathers of this state accomplished along in the sixties and seventies we would not be where we are, occupying vantage ground. One by one many of these pioneers have passed to their reward, but left their inestimable example to encourage us. But some are left, thank Heaven, co-operating unfalteringly, having never forsaken their first love.

Unjust were we in priding ourselves on some degree of victory, did we not repeat and put on record the fact, that, in the early times and in the darkest hours, when the Forestry Association was pronounced dead and ready for burial, the State Horticultural Society, so like Elisha at the departure of Elijah, took the mantle of responsibility on its shoulders, and the Forestry Association breathed in resurrection and lived to see a brighter day. We cannot too largely credit here, for at every annual meeting of this society our association is recognized as a co-factor in fruit raising by tree protection against adverse winds and undue evaporation, thus conserving humidity for the benefit of crops.

The year 1893 demarks a new epoch in forestry. Amid Minnesota's magnificent exhibits at the World's Columbian Exposition, stood that of forestry, and we will let it speak for itself. The forestry congresses, where talented representatives of different enlightened nationalities met to consider the vital problem involved, worked along the very lines where we work. The vast multitude that came to inspect the endless variety of wood specimens on exhibition in the forestry building, did not only admire but, evidently, resolved to rehabilitate the waste places of their native countries, and thus utilize the grand movement of placing scientific forestry to the front, where it belongs, initiatory to the twentieth century, close at hand.

Having thus secured good fighting ground, let us briefly summarize the duties before us: First, put this righteous vow on record, that the proposition, but crudely carved out a few years ago, to have a forest reserve at the sources of our principal rivers and lakes, is destined to materialize in some shape or other. This association has never given it up. We yield not a foot of ground to be wasted. We reverently swear the deserts of deforestation shall be made to yield their increase under tree beneficence. Let our object be repeated here; a dense forest wall to guard our agriculture against the polar winds; a dense roof of foliage, on a vast scale, and a leafy floor under it to forestall devastating floods and conserve the sur-

plus waters to flow to us when most needed; a canal system thence, ramifying over the state, distributing the water economically to secure certainty of paying crops, as in the mountain regions farther west; and the necessary establishment of a forest management under the control of the government, whereby the extravagant cutting of our yet remaining commercial timber shall be stopped and installments of the fittest of the young timber trees, the pines and oaks especially, shall be saved, and new ones planted and cultivated to perpetuate the lumber industry to our successors. Where is the man or corporation that would defeat so practical and necessary an enterprise in the name of the people and for the people?

Our lumbermen are beginning to understand what we are aiming at, conceding that our object is sincere and our labor a labor of love. They are the party most concerned in this movement, and are best qualified to shape a policy. They deplore the fire scourge and are ready to co-operate with any movement that will forestall or quench it. Then, we must consult them and demonstrate more effectually than ever that our object in promoting their interest is to promote the interest of the state.

But this gigantic enterprise is only a part of our responsible work. A vast prairie country to the west and north of the Twin Cities is not yet mastered. Comparatively, the trees are thin and scattered, not serving the purpose they might if planted more extensively and densely. Tree planting there must go on until the farmers can unfailingly raise clover; until, with this start, they can profitably engage in the dairy industry, as in the more southern portions of the state, where trees are more plentiful; until they discover they can raise something beside wheat, that does not pay costs; until our extreme heat of summer and cold of winter are thereby mitigated, coming to us with healthful humidity on their wings. Bear a hand, then, for our cause is the cause of the people's prosperity.

FOREST SAVING VS. FOREST RAISING.

PLATT B. WALKER, MINNEAPOLIS.

The most important obstacle in the way of any system of forestry—by which we mean the cultivation of trees for ordinary domestic uses—lies in the question of taxation. There is always to be considered the relation which exists between the cost of production and the market value of the product. It is, therefore, proper in considering the subject of tree planting to estimate its cost. The first item would be the cost of the land and the interest thereon, say, for twenty-five years. Then comes the expense of preparing the land for this use; next, the cost of procuring and planting the trees. Then comes the protecting of the trees from stock—in other words, fencing. In the prairie section, the protection from damage by fire would also be an important item. Then, last but by no means least, comes the question of taxation.

Estimating the value of a crop of trees produced by cultivation in a period of twenty-five years by the market value of trees in the

Middle States, the trees produced would not pay the taxes at the rate now imposed on timber lands in the pine regions of Michigan, Wisconsin and Minnesota. There is not a grove in the three states today, which, at present or prospective value, a business man would think of holding and paying taxes on for a quarter of a century. The squatters on the pine sections of these states, with the power of taxation vested in them by the state, render such preservation of forests out of the question and preclude the possibility of any general system of forestry, such as is practiced in Europe.

Undoubtedly, any reduction of taxation would be difficult, if not impossible, to obtain. The new and popular fad of levying all taxes on land is much more likely to obtain than that there will be any movement made to induce land owners to husband their timber for future use. The present system is simply a premium on timber destruction which is offered by the state. Nothing could be farther from the true interests of the people, especially the agricultural classes, than the taxation of timber lands, and to them it owes its existence, and they seem to favor every move to increase the burden.

These lands will soon be denuded and fire swept as the legitimate fruits of their system. There is no comfort in the reflection that they will soon reap the reward of their folly, because it will fall upon all classes. Better far that the state should provide not only exemption from taxation, but pay a premium to those who would preserve for future use the timber we now have, than to inaugurate a new and expensive system of bounties for tree planting. The interest on the investments will more than keep pace with the enhancement of value by growth of timber. The circumstance that these lands, for most part, are worthless for agriculture or grazing and will soon have no value whatever to state or owner, is a matter of serious import. Under present conditions they are worthless as a permanent investment.

These truths may subject the writer to the silly charge that they are written in the interest of the pine land owner. To suppose this were true does not alter the facts, for it is plain that, while it is to the interest of the public to have forests preserved, it is equally true that it is not to the interest of the owner of pine land to hold it and carry the burden of taxation imposed by the public.

Taxation on lands should be proportioned to the income derived from them, and measured by this rule, no pine land would pay taxes; its growth hardly pays the interest on its cost. The fact that the government sold these lands so cheap that many purchasers realized fortunes by investing in them, is a matter hardly worth mentioning in this connection, as it cuts no figure in solving the problem of how to secure a supply of timber for future use and conserve the public interests in the health and wealth-producing influences of forests.

To their influence, it is claimed, we owe a heavy percentage of our rainfall. What the result is to be when they are hewn down and their place occupied by an arid sandy plain, remains to be seen; but it cannot be too severe as a reward for the folly of this generation.

It would seem that such conditions ought to occupy the attention of the Society of Forestry of Minnesota, rather than the study of the question of how to produce forests after we have reduced the state to a condition where it will become the chief question to be discussed.

Minnesota now has in existence forests enough, not only to supply her own want at home but some to spare for market, if they are only husbanded as they should be under the fostering care of the state and individual owners. So far as these owners are concerned, their interests are in common with the public, but if the state can afford to force the destruction of the timber, these owners can do nothing but submit; but they neither can nor will submit any longer than is required to cut and market abroad the last stick under their control. They would be something more than merely ordinary, prudent business men, who do not want their property confiscated for the general benefit of the public, if they failed to slaughter the timber as fast as the market could be made to absorb it at home or abroad. They are entering no complaints whatever, but they "keep sawing wood just the same."

In closing this article, I wish to express a regret that the forestry branch of the state university, which would seem to be the only practical organized body to handle the subject, has not, as yet, called the people of the state to the existing condition and impending destruction of our forests. The scientific study of the subject ought not to so far monopolize the attention of the student, that the practical work and necessity therefor should be the paramount topic. The farmers' sons who receive the course ought to be there converted into practical foresters, whose knowledge covers the whole field from a simple American business standpoint, rather than trying to load down their memories with whole lexicons of unpronounceable Greek and Latin terms. The state needs practical foresters rather than lawyers, doctors, preachers, actors and "promoters."

THE PREMIUM PLAN OF FOREST RESERVATION.

J. O. BARRETT, SECRETARY.

The author of the article herein, entitled "Forest Saving vs. Forest Raising" is one of the leading lumbermen of Minneapolis, thoroughly posted in that branch of industry, and, as his article shows seriously deplores the existing conditions, and is ready to co-operate in any conservative forestry movement that is business-like. If, as I doubt not, he utters the sentiment of lumbermen generally, there is a sure prospect that they too will not consent to have an "arid sandy plain" occupying the place where once the grand old woods stood.

The pivot of Mr. Walker's argument is that the tax upon the timber lands is so heavy the owners cannot afford to preserve the growing timber longer than the profits of the present market warrant; nor hold the lands, on account of the tax, after the timber is cut. I trust that I correctly state his premises. If the burden of taxation

is the main cause of the woful neglect to save the remainder of our forests from an absolute wreck, then, in the name of common sense, let the tax system be so adjusted as to be an inducement to men to cease their persistent vandalism, and repent of their sins "before it is everlastingly too late."

Mr. Walker demands that "taxation should be proportioned to income." A just law that, and the farmers call for it more strongly than any other class. But, on the data of such a law, the farmer naturally asks of the gentleman, "would you or your coadjutors maintain that no tax should be levied on the lumberman's timber lands, and, if such lands were exempt, would you or they preserve the forest by virtue of that tax exemption? If the competition of the lumber industry is so intense that there is not profit margin enough in paying the tax, should the people of the state be held responsible for the ill luck? As the lumbermen do make profits, yet paying the tax, would 'the leopard change his spots' when the tax is lifted? On the contrary, would we not expect that the policy of saving the forest by non-taxation would, if applied, result in greater destruction of our forests because of the surety of greater profits?" These are pertinent questions.

But Mr. Walker suggests a happy departure, and builds wiser than he designed, perhaps. "Better far that the state should provide not only exemption from taxation, but pay a premium to those who would preserve the timber we now have than to inaugurate a new and expensive system of bounties for tree planting."

If he would take one more step forward—encourage the retention of bounty for tree planting on our prairies, and extend the system to our native forests, that is, "pay a premium to those who would preserve the timber we now have," the Forestry Association would feel that we surely have a Gladstone in the 'Lumber House' to lead the van of victory over the forest vandals. Surely we are not far apart. If he and the rest of his profession will lead off, or back the association in a bill at the next legislature to inaugurate the "premium system" for forest preservation, the tree reformation will have dawned.

Possibly Mr. Walker's premium plan would take the precedence of lumber profits by lumber risks; and that the remnant of our forests would be saved and put on the scale of extension on all non-agricultural lands.

Would the premium plan pay? That's the question to meet in the legislature. Would not the objection arise at once and fall upon it in one crushing blow, that it is unwise and impractical for a state to pay a man for improving his own land by tree preservation? But the state has already committed itself to paying the prairie farmer. Where the benefits accrue only to the proprietor, it would indeed be unwise and impractical. A forest is not like a crop of corn or potatoes; it concerns the interests of all the people, and the people, therefore, have just reason not only to encourage tree planting by bounties or otherwise, but to determine where the forests shall be planted and how managed for the most beneficial effects. The legislature ought to understand the great uses of forests in

conserving our water sources, in manufacturing soil, in staying devastating floods, in softening down cyclonic storms, in furnishing atmospheric humidity, in supplying the people with fuel and lumber and scores of other benefits that cannot be safely ignored.

In some parts of Europe, we are informed, where forestry is reduced to a profitably practical system, the government rewards the proprietor of a forest in installments, for a series of years, to preserve it intact, he using some of the coppice and rotting down wood, if any, for his personal needs. The private forests are thus placed under governmental supervision, allowing no destruction of any of the valuable timber; and when said timber is matured, the government cuts and markets enough of it to get its pay back. Thus the proprietor is encouraged to plant and conserve his forest by getting a premium in advance, and the government subsequently makes itself whole, and the people have the climatic benefit of it. Some such plan seems to be our necessity. It certainly removes the objection of paying out money without a money equivalent returned.

TREE PLANTING IN THE RED RIVER VALLEY.

Many residents of the Red River valley have had much difficulty in raising planted trees, greatly to their discouragement. When trees naturally grow along some of the rivers there, it should inspire them with hope. Evidently, where failure occurs, it is due to improper management. Of course, if their purchased trees are defective, and they are apt to be so when purchased of unscrupulous tree peddlers, or damaged by exposure to sun heat while planting, by shabby planting or by neglect to cultivate after planting, the trees will die, and that speedily. The following extract from a paper by Rev. O. A. Th. Solem, at the forestry session of the Horticultural Society, January 11, 1894, gives a sure index of success in that valley under right management. Halstad, where this forester lives, is located in Norman county, $47\frac{1}{2}$ degrees north latitude.—Secy. Barrett.

"Six years ago, I made an attempt to plant evergreens, but was careful not to procure trees from the canvassing agents. I gave my order to a responsible and highly recommended nursery. My trial order gave entire satisfaction, and as a result I now have several thousand trees of different varieties. Last year I had the pleasure of distributing a goodly number of these trees among my friends.

"I now have sixteen different varieties of evergreens, ranging from two inches to five feet in height, a majority of which seem to be thrifty and doing well. Scotch pine grows very rapidly. 'Colorado blue spruce' grows quite slow, but pleases and engages my attention the most. It is my intention to secure as many as possible of this fancied variety. I have quite a number of this variety from seed. Of deciduous trees, I have a vast assortment, such as elm, American linden, American larch, red cherry, European birch, etc. American larch grows very rapidly here. Red cherry and European birch remain unmolested as yet, but I cannot give any definite opinion as to their hardiness, this being the first winter of my experience with this variety.

"I planted a portion of black locust seed last spring. These grew to a height of about eighteen inches, and have not as yet been injured by frosts. I noticed that a few of these black locust seedlings had been slightly nipped by the frost, while others remained entirely untouched.

"Black walnut trees planted four years ago were slightly touched by frost the first spring after being planted; since that have remained thrifty and uninjured.

"The interest taken in tree culture increases each year, and my attention has been called to the fact that more trees were planted last spring than at any other time in the history of the Red River valley; but I cannot refrain from expressing regret in the face of the fact that cottonwood trees are planted in excess of any other kind, well knowing from personal experience and observation that the cottonwood is the least adapted to the soil and climate of this country."

FOREST EDUCATION AND ADMINISTRATION IN EUROPE.

N. F. BRAND, STATE UNIVERSITY.

When civilized man first entered Europe he found the forest reigning there supreme. Under the Romans these forests were little disturbed, and upon the fall of Rome a part even of the lands reclaimed were allowed to lapse back to the forestal condition. Even after the northern conquerors had settled down and had begun to partially imitate the civilized ways of the conquered—throughout the middle ages—the forest was not much encroached upon; because of the sparseness of population and the languishing condition of commerce and manufactures.

But when Europe awoke from her sleep of a thousand years and commerce and civilization began to renew their old-time activity, then the destruction of the forests began in earnest; and by the middle of the seventeenth century the French government, in order to avert the speedy annihilation threatened, was obliged to issue the celebrated *Forestry Ordinance of 1669*. Instead of the former haphazard cutting of timber, a plan was then instituted which prevailed for over a century. The forest was divided into blocks, one of which was deforested each year and replanted. Great results were anticipated from the operation of this system, and for a time it did well; but after a century's trial, its defects began to be seen. Though the acreage of available forest was preserved the same from year to year, yet the individual trees of later generations were smaller and poorer in quality than were those standing when the ordinance was promulgated. Because of the failure to apply scientific principles, the breed was fast running out.

France had meanwhile ceased to be the scientific center of Europe, and Germany had taken its place. In the latter part of the eighteenth century a succession of able German scholars turned their attention to forestry. Foremost among these were Hartig and Cotta. By these eminent men the forest was dealt with from a truly scientific standpoint. The several blocks were to be variously treated according to the differing nature of their soils, elevations, exposures,

climates and drainage conditions. Scientific principles were to be applied at every point, "rotation" of timber crops introduced, and the defects of the French system remedied. But under the new system the forests might no longer be managed by land-owners and lumbermen, but by a trained army of forest experts; and there must be schools in which to train this army. Cotta set himself to the task. In 1811, he founded the first public forestry school at Tharand, in Saxony. From Tharand, the mother school, went forth the founders of the schools which in the next few years sprang up all over Europe; first in Germany, then in Russia, Austria, France, Switzerland and most of the other countries. Russia has four schools, one of them located on the arid steppe, which the government is trying in some measure to forest. Austria has nine government schools and over eighty private schools. Even bankrupt Spain and Italy have one each. Only England, Turkey and some of the fourth class powers are without them.

FORESTRY EDUCATION.

And now as to the education imparted at these schools. Take the mother school of Tharand as a good example, and what I say of it will apply in general to most of the other forestry schools of Europe.

He who seeks admission as a student must be a graduate of a German high school, and must have spent at least six months in the service as a forest guard. Then he is admitted to a course of study covering two and one-half years. The studies pursued are divided into three groups; fundamental sciences, professional sciences and additional sciences.

I. FUNDAMENTAL SCIENCES.

Under the head of fundamental sciences, he is taught the application of the physical and mathematical sciences to forestry.

Applied chemistry teaches him of the chemical composition of forest soils, the chemical changes occurring in the growth and decay of trees, and the engredients needed by different varieties. Applied minerology teaches him to distinguish the different minerals which enter into forest soil; while applied botany introduces him to the special botany of forest trees. In applied zoölogy the student learns of the various beasts and birds inhabiting the Saxon forests, both useful and injurious; the useful part which some insects play in the formation of forest mould and in the destruction of decaying wood and obnoxious vegetation; and, on the other hand, he studies the insects injurious to timber and the approved methods of destroying them.

That the forester may not be tempted to leave the lonely forest and return to the gay world, the student is taught all the secrets of the chase and the huntsman's art, how to use and care for the hound and rifle. And lastly, in applied meteorology, the elements of climate upon forest growth, and the climatic influence of forests upon

adjacent regions are all duly considered. And thus, as applied sciences, the various fundamental sciences are made the hand-maidens of forestry.

2. PROFESSIONAL SCIENCES.

The second group of sciences studied is that of the professional sciences. The educated forester must not only be able to apply the various physical sciences to his work, he must also be able to use the technical rules of forestry embodied in the so-called professional sciences.

In the first of these, history and literature of forestry, he is made acquainted with the details of the history of forestry systems, the rise and fall of forests in all lands and ages and the voluminous works on the science in all European tongues. Forest culture treats of the seeding of new plantations, cultivation, thinning and trimming. In fact, under the head of forest culture is considered about all of what to us Americans constitutes forestry. In forest finances the student learns how to dispose of the thinnings and ripe timber to advantage; the rules governing the payment of forest guards and officials; the approved mode of transmitting the forest moneys, and the ways of keeping forest accounts.

Political economy is studied from the point of view of the forest. The production, distribution, exchange and consumption of forest products alone is considered, as well as the economic bearings of the forest upon the general commerce of the world. Under forest administration is considered the composition of the forestry corps, the relation of that body to the general administration of the kingdom, the division of the forest into districts and sub-districts, and methods of supervision. The student is also taught forest mensuration—the measurement of lumber, standing trees and plots of timber.

He must also know the game laws of the kingdom, and the regulations to prevent forest fires and the trespassing of stock, embraced under the head of forest police.

3. ADDITIONAL SCIENCES.

The third group of studies, the additional sciences, are not directly connected with the subject of forestry. They comprise general finance, Saxon law, rural economy and meadow culture.

4. EXCURSIONS AND OPERATIONS.

In addition to the regular lectures, recitations and studies, certain days of the year are set apart for excursions; when the students, under the lead of their instructors, pass from forest to forest, noting the practical application of the principles dealt with in class. Also, whenever there is any important undertaking on hand, such as the building of a forest bridge or the preparation of a new plat for planting, the school will be called to the scene of operations and the senior scholars will be allowed to assist in the work.

Having finished the above mentioned studies the student is graduated; but he is not yet allowed to enter the forestry service as a commissioned officer. He must pass from five to six years in the forest before he can do that. Then after passing a final examination he receives his commission as overforester, and the way to promotion is open.

THE ADMINISTRATION.

Just one word as to the service to which he is then admitted. In Saxony and in most of the European countries it is constituted as follows: The commissioned officers are recruited entirely from the schools. They are of four grades; overforesters, forest-masters, overforest-masters and directors. All the forests of the country are controlled by one or more directors residing at the capital. Each separate forest is entrusted to an overforest-master; the different districts of the forest to forest-masters; and the sub-districts or compartments to overforesters. These commissioned officers wear a uniform, rank with the army and navy officers and receive in some cases even higher pay, and are held in the highest respect by the community.

Each overforester works his compartment with the aid of various subordinates, foresters, under-foresters, guards, planters, and forestry graduates, the rank and file of the forest army.

OUTLOOK FOR AMERICA.

A closing word, gentlemen, as to the application of this subject to American affairs. America has but just awakened; but she is awake. Witness the state parks set aside recently in New York, Wisconsin and California, and the attempts in that direction in Minnesota. Witness the recent creation of forest reserves by the national government in Colorado, Wyoming, Arizona, Utah, Oregon, Washington and California; and similar work attempted in Minnesota. And lastly, witness the study of forestry taken up in the schools of the country, and in this particular Minnesota has not lagged behind but stands fairly in the front rank. One of the few courses given in forestry in America is given at our Minnesota School of Agriculture. Prof. Green conducts a forestry class three days in the week, for a period of twelve weeks each year. This is but a taste of the subject, and that more from the agricultural than from the forestal point of view. And yet that taste is sufficient to make the student the friend of the forest instead of its natural enemy, as man is said to be; and to inspire him with aspirations for a fuller forestry education and a better administration of our forests; and, thus, this work at St. Anthony Park, it is to be hoped, may be the seed from which a good school of forestry may sometime spring up in Minnesota.

A MOVEMENT TO PREVENT FOREST FIRES.

Report of a meeting held at the Commercial Club rooms, in St. Paul, Oct. 3, 1894.

PREPARED BY J. O. BARRETT.

What the Horticultural Society and Forestry Association for many years have agitated and plead for, is realized sooner than any of us anticipated. The late terrible calamity at and around Hinckley, whereby hundreds of men, women and children and millions of dollars' worth of valuable property were burned up, have touched the hearts of our people, not for the relief of the bereft sufferers alone, but for a determined effort to avert such destruction for the future.

The Commercial Club of St. Paul initiated a call for a mass forestry meeting in that city on the third of October, 1894, to consider measures for the prevention of forest fires and the preservation of the forest resources of the state. So far as possible, it is of historic importance that the names of the men who came as representatives of business and reform institutions should be put on record. There were present President W. J. Footner, Capt. H. A. Castle, C. H. Chittenden, B. Sommers and Secretary McGinnis of the St. Paul Commercial club; E. W. Peet, C. C. Andrews, J. D. Ludden, R. C. Jefferson and E. J. Hodgson, of the St. Paul Chamber of Commerce; Col. C. H. Graves of Duluth and H. H. Hart of St. Paul, both members of the state fire relief commission; President John H. Stevens, Secretary J. O. Barrett, O. F. Brand of Faribault, N. F. Brand of the State University, William R. Dobbyn of Minneapolis and Prof. S. B. Green of the State University, members of the State Forestry Association; A. W. Latham, secretary of the State Horticultural Society; Prof. Conway McMillan and Prof. Hays, of the State University; William Powell, C. S. Cairns, B. F. Nelson, H. B. Hodson and J. T. Hemphill, representing the Minneapolis Board of Trade; C. H. Pratt of Minneapolis, L. O. Tomblar of Wyoming, Minn.; John Cooper of St. Cloud; H. B. Ayres of Carlton, Minn., who is a representative of the Forestry Division of the United States Department of Agriculture; Maj. W. A. Jones, United States engineer in charge of the rivers and harbors of the Northwest; Maj. Joyce of Iowa, who has lumber interests at Shell Lake, Wis.; A. M. Hannaford, Claremont, N. H.; A. H. Lee of Minneapolis, Prof. Phelps of St. Paul and Charles C. Brown of Duluth.

Earnest and co-operative letters were read by Secretary McGinnis, among them one from Hon. W. W. Barrett, superintendent of irrigation, forestry, fish and game of North Dakota, who urged a country-wide action along the lines embodied in the call; from Hon. A. Bierman, state auditor, who said he believed "the railroad and lumber companies would willingly co-operate in preserving the state forests;" from Prof. J. H. Winchell, state geologist, expressing "the hope that the meeting might result in something effective." He estimates that three-fourths of the northern part of the state has been devastated by these fires, and urged that some measures be taken, not only to prevent the destruction of the natural forests, but to cultivate the areas on which young trees are now growing, and says he will be glad to co-operate in any plan that may be adopted looking to these ends. Prof. E. B. Fernow, Chief of the Forestry Division at Washington, D. C., outlined a practical method by which to re-

duce forest fires to a minimum. He advocated radical and determined action. He significantly stated that paper legislation would do no good; there must be a well organized forestry department and money to pay for it. The railroads and lumbermen should co-operate, being equally interested with the government and the state at large.

Gen C. C. Andrews in a valuable paper called attention to the appalling calamity caused by the forest fires in our state, urging some wise measure to prevent the recurrence of anything so awful.

"Minnesota itself owns 1,269,000 acres of timber land, granted by congress for educational purposes. Although only 20 per cent, probably, of the original pine remains, it is, nevertheless, a vast property, and shows the great direct pecuniary interest our state has in this subject. About 25,000,000 acres of the surface of Minnesota is natural forest land. The greater part of this is pine, or only suited for pine, and, although the best of the original trees have been cut—trees, many of them, which were 200 years in maturing—yet, if what is left can be cared for from now on under regular forestry management, it will be a rich and permanent resource, affording remunerative labor for many thousands of people."

Quoting various authorities as to the extent of Minnesota forest fires, the speaker went on to score the general government in selling timber lands at a nominal rate, and contrary to all business or moral ideas. He gave a summary of European forestry, from which most of our ideas are borrowed. The forestry systems of New York, New Hampshire and Maine were then briefly reviewed, and those states complimented upon the work accomplished. Said the general:

"Those three states should be honored for their enlightened action in respect to forestry. Minnesota has far greater forest interests than either of them, and would derive credit before the country, if she could improve upon their plan, especially as to the prevention of fires. Let the subject be agitated by commercial organizations and by literary societies in institutions of learning. Let all the light be obtained that is possible. Also, as the general government still holds about 5,000,000 acres of timber land within our state, an intelligent public sentiment should strongly support our Minnesota senators and representatives in their efforts to have congress adopt an efficient forestry system to operate in harmony with the plan that may be devised by our own legislature."

J. O. Barrett, Sec'y of Forestry Association, set forth the importance to the state of preserving the forests, and submitted the bill introduced by Senator Allen two years ago. This bill provides for a forestry commission, especially equipped to prevent fires by means of patrols; indemnities, fire wardens, etc. It fixes the responsibilities of railroads, compelling them to use spark arresters, clear their rights of way from inflammable material, and holds them liable for damages arising from neglect of law. Provisions are made covering danger from camps of lumbermen and hunters, compelling all such to clear a space of twenty feet radius. Cigars and pipes are forbidden in the woods during the danger season, and hunters are compelled to use non-combustable wads. Stringent provisions are also made against firing felled pieces, meadows and grassy spots during the season when danger may be apprehended. In conclusion, Mr. Barrett advocated the following:

"More reservoirs in our state to economize our surplus water, which in the spring runs to waste in the form of devastating floods, to be used for irrigation and navigation by a canal system.

"More encouragement for tree-raising on our open prairies, and especially along our river shores and bluffs.

"Congressional and state legislation to develop and preserve dense and vast tracts of forests at the sources of our principal rivers, on all non-agricultural and non-mineral lands in our northern woods, but open for railroads and for sales of matured and surplus timber of any sort to lumbermen and manufacturers under wise and economic management.

"The extension of our tree bounty law in such a way for forest culture on our prairies or on all needful places in our woodlands, that the acreage may be safely increased, that all parties receiving bounty money for such planting or saving of

trees shall give security to the state, the forest commissioners supervising, so that the premiums advanced in defined installments shall be reimbursed with or without interest by the state selling matured or surplus timber enough thereon to cover such expenditure.

"Practical forestry introduced into our educational curriculum.

"For the successful projection of these enterprises under this or some better system of work, the Forestry Association, that for nearly twenty years has toiled so hard to accomplish, respectfully and earnestly pleads for co operation of lumbermen especially, in unity of force, to the end that human life and property in our woods or on our prairies may no longer be sacrificed or menaced by fires, and that practical forestry, with its sequential humidity and climatic healthfulness may be made a most prominent feature of our legislative policy in our then most enriched and more beautiful Minnesota."

THE RESERVOIRS.

Maj. W. A. Jones said:—

"The great reservoirs of the Mississippi are successfully accomplishing the work for which they were designed. In this, the driest year on record, they are delivering into the river, during a period of ninety days, about 2,200 cubic feet per second in excess of what would otherwise be running. This is equivalent to about 1,425,000,000 gallons per day. They are insuring a good navigable river from St. Paul to Lake Pepin, and are creating the anomaly of a good river in its upper reaches which cannot be reached by the ordinary steamboats on the river below because of a lack of water there.

"The benefits of these reservoirs do not stop with navigation. They are far-reaching, and extend to the point of being a potent factor in forest preservation. No time should be lost in extending the system to the Minnesota and Red River of the North. The forests furnish a crop standing ready for the harvest; the product is a necessity to civilized man; there is nothing in sight to replace it. It is a straight business proposition to so regulate the harvest that only what is fully ripe should be reaped, and a new crop cultivated in its place. It is a perfectly feasible matter to perpetuate it. It is still more of a business proposition to prevent, as much as possible, the destruction and waste of the product.

"The climate of Minnesota is more than ordinarily dry, and her forests are thus very much exposed to damage by fire. It is not reasonable to expect that this danger can be wholly averted. But it can be minimized, and that to such a point as to abolish the great danger to human life. But we cannot readily get something for nothing here below, and it will be best to figure on paying out some money for the preservation of our forests and the lives of our people. The matter can only be handled through legislation. The law must provide an organization, together with sure and reasonable penalties. During the danger season the forests must be patrolled and watched. It might perhaps be wise to combine fire wardens and game wardens in single individuals. There should be a sharp penalty inflicted on each and every party who is responsible for starting a fire in the forest. The law should provide an organization of persons, and, above all things, the money for apprehending and punishing offenders."

TALKS AND RESOLUTIONS.

Prof. Conway McMillan, state botanist, contributed valuable statistics, respecting the causes of forest fires and the ratios of population per square mile in different nationalities and states, showing in northern Minnesota there is but one male adult in every ten square miles of territory; hence, he agreed that the sparseness of population in Minnesota forests makes their protection much more difficult. Forest fires are not entirely preventable. In Germany, where the best management is in force, fires still occur. They can, however, to some extent, be guarded against and controlled. How to do this must be determined, not upon continental models, but by the development of American methods suited to American conditions. It is probable that no forest reserve, forest police or forest warden system yet proposed would be effective. The prevention of fires was a business matter and must have the support of business men. There must be a general arousing of interest or nothing would be accomplished. Talking would do no good and there must be a simple, practical plan proposed.

John Cooper, of St. Cloud, thought the prevention of forest fires was entirely practicable with the co-operation of the people of the forest districts.

E. S. Chittenden introduced a resolution providing for the appointment of a committee of five to draw up a suitable law for the prevention of fires, and endeavor to secure its passage during the coming winter.

C. S. Cairns, of Minneapolis, seconded the motion to adopt the resolution, and urged the appointment of men of political influence, urging that such a committee would have much more influence than any other.

Col. J. H. Stevens roasted the last legislature for rejecting the bill for the protection of forests drawn by the Forestry Association, and introduced by Senator Allen, and said that if it had been passed, he believed Hinckley would have been in existence today. He believed the Commercial Club had taken the proper step in first agitating public sentiment in favor of such a law before it was introduced.

Col. C. H. Graves thought that the coming legislature would be ready to listen to any reasonable demands in the way of protection, though, of course, they would encounter a great many obstacles in the way of pecuniary interests, vested rights and all that sort of thing; but the only way was to handle the question with an iron hand, just as infectious diseases are handled.

Prof. W. M. Hays, of the State Experiment Station, spoke of the effect on the soil, and differed with those who contend that the fires benefitted the soil, and held that, in the aggregate, the soil of all kinds was much damaged by the burning over.

Prof. S. B. Green said it was time for the state to step in and by experiments determine what the lands from which the trees have been cut can be used for. There is no accurate detailed information on the subject now. For the protection of the standing forests he advocated something in the nature of a police patrol, the details of the plan to be left to a practical commission.

Prof. W. R. Dobbyn said the Forestry Association found when they started out that the first move necessary was to create a forestry sentiment, of which there was none. After some years work they have come to a better understanding with the lumbermen and others opposed to them, and with the emphasis added by the Hinckley disaster, he thought the sentiment would pass the law this winter. He deprecated the appointment of a legislative committee of politicians, and wanted the members selected from the business interests.

Mr. Ayers, a forestry expert from Carlton, thought Mr. Fernow's idea of destroying the tree tops and other debris impracticable, and the expense to the lumbermen would be almost as great as the logging operations themselves. He thought a hearty co-operation between the people in the forests would be far more practicable than legislation.

Mr. Joyce, of Iowa, manager of a big lumber company near Shell Lake, said every logger should be required to burn the tops of the trees in the spring. They would find it for their own interest as well as that of the public. The resolution by Mr. Crittenden was adopted and so was a resolution by Prof. Green declaring that "practical forest management contemplated the use of the timber for the public and its reproduction on the land after such use."

Col. J. H. Stevens introduced a resolution memorializing President Cleveland and urging him to make some recommendation to congress for protection of United States timber. The resolution was passed.

Col. C. H. Graves introduced a memorial to the legislature calling their attention to the great destruction of forests in this state: that the state holds 1,269,000 acres and the United States 5,000,000 acres of forest likely to be damaged by fire, and 25,000,000 acres of natural forest land which should be protected, and urging that the subject be given careful consideration. The resolution was adopted, as was a resolution by E. S. Crittenden, calling upon each member to exert his influence to create a public sentiment in favor of suitable forestry laws, and the appointment of a committee of one in each county for the same purpose. Mr. Crittenden also introduced a resolution, adopted unanimously:

"That the governor of Minnesota be requested to call the attention of the next legislature of this state in his message to the great importance of the enactment of a proper law for the prevention and suppression of forest fires, and the protection and preservation of our valuable timber interests."

Secretary McGinnis, of the St. Paul Commercial Club, spoke on the prevention methods used in India, where the forests are divided into sections, separated by well cleared spaces. He suggested the application of the same methods here. Prof. Hays and others spoke along the same line.

Mr. C. C. Brown, of Duluth, presented a resolution endorsing the reservoir system of the state and urging the further construction of reservoirs at the headwaters of the Mississippi, Red, Minnesota, St. Louis, Cloquet, St. Croix and other streams having their headwaters in the state.

The chair announced that he desired time to appoint the committee to present the matter to the state legislature, as it was a very important committee.

FUTURE SUPPLIES OF TIMBER.

That it is now time to consider the question of future supplies may now be inferred from the following rough estimate, the only kind possible with our present statistical knowledge. We use in the United States, according to estimates based upon census and other figures, over 22,000,000,000 cubic feet of wood annually. Of this enormous amount (about 350 cubic feet per capita), over 4,000,000,000 cubic feet of the best timber are made into lumber (between 30,000,000,000 and 40,000,000,000 feet, board measure); railroad construction requires about 500,000,000 cubic feet; and fencing takes an equal amount; but by far the largest consumption is for firewood. An uncertain amount is burnt up every year in forest fires, which range over the western mountain country especially, and which swell the total consumption, probably, to beyond 25,000,000,000 cubic feet annually. During the last three decades, an increase of about 30 per cent in consumption in each decade is indicated. The area covered with wood growth is less than 500,000,000 acres. If all the land area not known to be treeless or in farms, were under forest, the acreage would not exceed 850,000,000 acres, but the lower figure is probably more nearly correct.

From the careful statistics of the German government and from the records of private forests, we know that the annual growth of wood per acre and year does not average more than 55 cubic feet, though, under favorable conditions, it may rise to double that amount with some species. In this yield are included branches and smaller dimensions down to three inches diameter, which are not used in this country. If we refer only to the production of such sizes as are used in this country, our timber at the age of 125 years would be found to have grown, at best, not more than 35 cubic feet per year per acre. Our present acreage, therefore, even if it were well stocked and well managed, could not produce our annual consumption. But we do know that much of it is badly stocked, occupied with poor timber and not cared for. We are, therefore, consuming much more than the area reproduces, probably double this amount, and with every year the disproportion grows. Were we to assume that 10,000 feet, board measure, is now standing on every acre of the whole forest area—an extravagant estimate, even with the enormous stumpage of the Pacific coast forests—our area could not supply our need for much over one hundred years, the time it takes to produce a good sized saw-log. Most of the timber we are now cutting is over 200 years old. The probabilities are that the end will be visible much sooner. For the white pine, the end—relatively, not absolutely—is now in sight, and the same is true of walnut, yellow poplar and ash. Hence the need of attention to secure careful and more thorough utilization of our timber products, and, especially, the prevention of unnecessary waste, is indicated, even from considerations which relate solely to the pecuniary interests of the lumberman.

REPORT OF COMMITTEE ON FORESTRY.

LYCURGUS R. MOYER, MONTEVIDEO.

A forest is a tract of country covered with trees—generally of considerable extent. There are no forests in western Minnesota. We have no evidence that there have been any forests there for thousands of years. There are no indications now that there will ever be any forests there.

Forestry is the art of caring for forests. Where there are no forests there can be no forestry.

The probable reason for the fact that no forests exist in western Minnesota is that the climate is not adapted to forest growth. Some have imagined that the climate of a country depends on the presence or absence of trees. More careful study has shown that the reverse of the proposition is true. It is the climate that produces the trees, and not the trees the climate. That is the general principle. The climatic modifications produced by trees are extremely local. No person who has been overtaken by a storm in an open country, and who has found shelter on the leeward side of a fine grove, can have failed to notice the local climatic modifications produced by the trees; but the storm itself is unaffected. It merely rises over the trees and keeps on its course with unabated speed.

The little strip of sheltered country behind the grove can have had scarcely any effect on the general climatic conditions. The same effect might have been produced by a fence or the walls of a house. The great storm waves that sweep over our country are thousands of feet in height, and it is probable that they travel with nearly the same velocity over the tops of trees as over the open ground. The friction produced by the trees on a few feet of the lower stratum of the moving air mass must have a very trifling effect on the stately progress of the storm. It has been claimed, too, that with the removal of forests the rainfall of a country is diminished, and that with the planting of trees the summer shower becomes more frequent and reliable. Ohio was once a well timbered state, but now the forests have been almost wholly removed. The most careful study of the rainfall there has failed to show that there has been any change in the amount of the annual precipitation since the first settlement of the state.

Forests are of slow growth under the best of conditions; and take many years to mature their crops. They can only be made to pay on waste land where the climatic conditions are right. The rich corn and wheat lands of western Minnesota—the black prairie lands—are too valuable to raise forest crops on. Besides this we have no reason to believe that forests will ever succeed on the prairies—*i. e.*, that they will ever produce paying crops of merchantable timber. Probably, the rainfall is insufficient.

The most promising tree for forest planting on the prairie is the native bur oak; but many generations of men must pass away while it is maturing a crop, and then it is likely to be short in body and bushy on top. The cottonwood is a valuable timber tree when grown on rich alluvial bottoms, producing great saw logs whose value is but beginning to be appreciated; but on the prairie it is short-lived and unsatisfactory. There is little in its habit of growth to encourage us in the belief that the prairie cottonwood will ever produce valuable saw logs. The box elder grows rapidly on the prairie, and matures early, but it is always small, and never will produce timber fit for the sawmill. White maple is the best all round tree for planting on the prairie, but it is apt to be broken by winds and split down by snows; there is as yet no evidence that it will produce on the prairies the valuable timber that we know it to be when grown in its native river bank habitat. Our native green ash is always a small tree. Our white elm grows to good size on moist bottoms, but it would hardly pay to raise a crop of it even there, much less so on dry prairie where it scarcely succeeds without good cultivation. Many kinds of willows will grow on the prairie; but who of us is sure that a willow forest will ever produce merchantable timber?

These are facts and we may as well look them squarely in the face. How much more reason then is there for taking prompt measures to preserve the natural forests in the northern parts of the state? No more swamp land ought to be granted away there to railroads. No more timbered school land ought to be sold. The state's title to all timbered land acquired at tax sales ought to be perfected, and the legislature ought to be prohibited by constitutional amendment from ever selling it. An intelligent forestry policy ought to be adopted, and measures taken to stop forest fires. As crops of timber mature the stumpage or the product ought to be sold under careful restrictions, so that the forest should be preserved, to the end that the state forests should always remain a source of permanent income to our noble commonwealth.

AWARD OF PREMIUMS

ON FRUITS AND FLOWERS AT THE LATE STATE FAIR.

CASPER W. AYRES, Hartland, Minn.:			Variety.			Premium.	Amt.
Variety.			L. E. DAY, Farmington, Minn.:				
Duchess of Oldenburg	2d.	\$1.00	Collection of hybrids,				
Mrs. ISABELLA BARTON, Excelsior, Minn.:			(amateur)	2d.	\$8.00		
Wealthy	2d.	1.00	Wealthy apple	2d.	1.00		
Collection of grapes	2d.	20.00	Transcendant	1st.	1.50		
Concord grape	2d.	1.00	Briars' Sweet	1st.	1.50		
Duchess	3d.	.50	Early Strawberry	1st.	1.50		
Early Victor	1st.	2.00	Total		\$13.50		
Empire State	2d.	1.00	DITUS DAY, Farmington, Minn.:				
Moore's Early	2d.	1.00	Collection of apples (amateur)	5th.	\$4.00		
Niagara	1st.	2.00	" " hybrids	1st.	10.00		
Pocklington	2d.	1.00	Duchess of Oldenburg apple	3d.	.50		
Po'keepsie Red	2d.	1.00	Wealthy	2d.	1.00		
Worden	3d.	.50	Haas	2d.	1.00		
Wyoming Red	2d.	1.00	Fameuse	3d.	.50		
Martha	1st.	2.00	Malinda	3d.	.50		
Eldorado	1st.	2.00	Virginia	2d.	1.00		
Total		\$36.00	Florence	3d.	.50		
WM. BRIMHALL, Hamlin, Minn.:			Lou	1st.	1.50		
Forest Garden plum	1st.	\$1.50	Early Strawberry	3d.	.50		
A. A. BOST, Excelsior, Minn.:			Minnesota	3d.	.50		
Collection of grapes	5th.	5.00	Total		\$21.50		
Concord grape	2d.	1.00	E. H. S. DARTT, Owatonna, Minn.:				
Iona	3d.	.50	Collection of apples (prof.)	4th.	\$15.00		
Lindley	3d.	.50	" " hybrids	4th.	4.00		
Lady	2d.	1.00	Tetofsky apple	1st.	2.00		
Desota plum	3d.	.50	Duchess of Oldenburg	1st.	2.00		
Total		\$8.50	Wealthy	2d.	1.00		
MRS. A. S. BABCOCK, St. Anthony Park, Minn.:			Whitneys	2d.	1.00		
Collection of house plants	1st.	\$5.00	Minnesota	1st.	1.50		
" " coleus	2d.	1.00	Collection of hybrids and siberian seedlings	2d.	5.00		
" " geraniums	2d.	2.00	Total		\$31.50		
" " foliage plants	2d.	2.00	M. M. FRISSELLE, Eureka, Minn.:				
Total		\$10.00	Delaware grape	2d.	\$2.00		
SIDNEY CORP, Hammond, Minn.:			Lindley	2d.	1.00		
Collection of apples (amateur)	1st.	\$20.00	Total		\$3.00		
Wealthy apple	2d.	1.00	F. G. GOULD, Excelsior, Minn.:				
Lieby	3d.	.50	Transcendant apple	2d.	\$1.00		
Autumn Streaked apple	1st.	2.00	Virginia	1st.	1.50		
Rollins' Prolific	1st.	2.00	Hyslop	3d.	.50		
Elgin Beauty	1st.	2.00	Rollingstone plum	3d.	.50		
Good Peasant	1st.	2.00	Collection cut flowers	3d.	3.00		
McMahon White	1st.	2.00	" roses, 6 varieties	2d.	3.00		
Total		\$31.50	Twelve in. basket of flowers	1st.	10.00		
DEWAIN COOK, Windom, Minn.:			Total		\$19.50		
Okabena apple	1st.	\$2.00	JNO. S. HARRIS, LaCrescent, Minn.:				
Collection of plums	2d.	4.00	Collection apples (prof.)	1st.	\$30.00		
Desota plum	1st.	1.50	" " hybrids, etc. (prof.)	2d.	8.00		
Forest Garden	3d.	.50	Utters apple	2d.	1.00		
Rollingstone	1st.	1.50	Rollins' Pippin	2d.	1.00		
Wolf	1st.	1.50	Ostreko	2d.	1.00		
Total		\$11.00	Antinovka	3d.	.50		
H. L. CRANE, Excelsior, Minn.:			McMahon White	3d.	.50		
Collection of grapes	4th.	\$10.00	Okabena	2d.	1.00		
Agawam grape	1st.	2.00	Walbridge	3d.	.50		
Brighton	1st.	2.00	Powers	1st.	1.50		
Concord	1st.	2.00	Fameuse	2d.	1.00		
Delaware	1st.	2.00	Collection seedling apples	1st.	15.00		
Duchess	2d.	1.00	Fall variety apple, seedling	3d.	3.00		
Herbert	2d.	1.00	Winter variety	2d.	10.00		
Iona	1st.	2.00	Total		\$74.00		
Janesville	1st.	2.00					
Moore's Early	2d.	1.00					
Packlington	3d.	.50					
Total		\$25.50					

Variety.	Premium.	Amt.
R. C. KEEL, Rochester, Minn.:		
Collection of apples (prof.)....	3d.	\$20.00
" " hybrids, etc. (prof.)	1st.	10.00
Tetofsky apple.....	2d.	1.00
Duchess of Oldenburg	2d.	1.00
Lieby ".....	2d.	1.00
Haas ".....	3d.	.50
Gilbert ".....	1st.	2.00
Autumn Streaked	3d.	.50
Red Queen ".....	1st.	2.00
Rollins' Prolific	2d.	1.00
Hyslop ".....	2d.	1.00
Florence ".....	1st.	1.50
Martha ".....	2d.	1.00
Collection seedlings, apples.....	3d.	5.00
" " hybrids, etc seedl'gs	1st.	10.00
Winter variety, seedling.....	1st.	15.00
Rollins' Russett	2d.	1.00
Rollins' Pippin.....	1st.	2.00
Elgin Beauty.....	2d.	1.00
Winter White Pigeon.....	1st.	2.00
Good Peasant.....	3d.	.50
Borovinka.....	1st.	2.00
Ostrekof.....	1st.	2.00
Charlamof.....	2d.	1.00
Malinda.....	2d.	1.00

Total \$86.00

RUDOLPH KNAPHEIDE, St. Paul, Minn.:		
Collection of grapes.....	3d.	\$15.00
Barry (Roger's No. 43) grape	1st.	2.00
Concord grape.....	3d.	.50
Delaware ".....	3d.	.50
Herbert ".....	3d.	.50
Janesville ".....	3d.	.50
Lady ".....	3d.	.50
Massasoit ".....	2d.	1.00
Moore's Early grape.....	3d.	.50
Wildgrape.....	2d.	1.00
Telegraph ".....	1st.	2.00
Cottage ".....	2d.	1.00
Eldorado ".....	2d.	1.00
Collection of plums.....	3d.	2.00

Total \$28.00

A. W. LATHAM, Minneapolis, Minn.:		
Duchess of Oldenburg apple....	2d.	\$1.00
Lieby apple.....	2d.	1.00
Collection of grapes.....	1st.	25.00
Agawam grape.....	2d.	1.00
Brighton ".....	2d.	1.00
Delaware ".....	2d.	1.00
Empire State grape.....	1st.	2.00
Herbert grape.....	1st.	2.00
Janesville ".....	2d.	1.00
Lindley ".....	1st.	2.00
Lady ".....	1st.	2.00
Massasoit ".....	1st.	2.00
Moore's Early grape.....	1st.	2.00
Pocklington ".....	1st.	2.00
Wilder ".....	1st.	2.00
Worden ".....	1st.	2.00
Cottage ".....	1st.	2.00
Wyoming Red ".....	1st.	2.00
Aminia ".....	1st.	2.00
Martha ".....	2d.	1.00
Forest Garden plums.....	2d.	1.00

Total \$57.00

CHAS. LUDLOFF, Carver, Minn.:		
Collection of apples (amateur).....	3d.	\$10.00
" " hybrids, etc. ".....	3d.	6.00
Malinda apple.....	1st.	2.00
Briar's Sweet apple.....	3d.	.50
Barry (Roger's No. 43) apple.....	2d.	1.00
Collection of plums.....	1st.	6.00
Weaver plum.....	2d.	1.00
Rollingstone plum.....	2d.	1.00
Wolf ".....	3d.	.50
Ocheeda ".....	1st.	1.50

Total \$29.50

Variety.	Premium.	Amt.
O. M. LORD, Minnesota City, Minn.:		
Fameuse apple.....	1st.	\$2.00
Walbridge ".....	2d.	1.00
Weaver plum.....	3d.	.50
Cheney ".....	1st.	1.50
Ocheeda ".....	1st.	1.50
Fall variety seedling apple.....	1st.	8.00

Total \$14.50

MRS. WM. LYONS, Minneapolis, Minn.:		
Collection of currants.....	1st.	\$3.00
" " strawberries.....	1st.	4.00
" " raspberries.....	1st.	4.00
" " house plants.....	2d.	3.00
" " coleus.....	1st.	2.00
Climbing vine.....	1st.	2.00

Total \$18.00

GEO. MILLER, Faribault, Minn.:		
Collection of apples (amateur).....	4th.	\$6.00
Peerless apple.....	1st.	2.00
Collection of seedling apples.....	2d.	10.00
Fall variety seedling apple.....	2d.	5.00

Total \$23.00

E. NAGEL & Co., Minneapolis, Minn.:		
Collection of greenhouse and hothouse plants.....	1st.	\$40.00
Collection of foliage plants.....	2d.	15.00
" " climbing vines.....	1st.	3.00
" " five hanging bas- kets.....	1st.	3.00
" " coleus.....	2d.	3.00
" " tuberous bego- nias.....	1st.	5.00
Single specimen palm.....	2d.	2.00
Tuberous-rooted begonias.....	1st.	2.00
Geraniums in bloom.....	3d.	2.00
Collection of geraniums.....	2d.	2.00
Twelve carnations in bloom.....	1st.	3.00
Collection cut flowers.....	2d.	5.00
Asters.....	1st.	3.00
Carnations.....	1st.	3.00
Roses, six varieties.....	1st.	5.00
Twelve roses, basket of flowers.....	2d.	5.00
Bridal bouquet.....	1st.	3.00

Total \$104.00

WM. OXFORD, Freeburg, Minn.:		
Collection apples (amateur).....	2d.	\$15.00
" " hybrids and siberi- ans (amateur).....	4th.	4.00
Utters apple.....	3d.	.50
Anisim ".....	1st.	2.00
Alexander apple.....	1st.	2.00
Walbridge ".....	1st.	2.00
Talmon Sweet apple.....	1st.	2.00
Martha apple.....	3d.	.50
Collection hybrids, etc. (amat'r)	3d.	3.00

Total \$31.00

MRS. J. M. POMEROY, Minneapolis, Minn.:		
One pair of hanging baskets.....	1st.	\$2.00

Total \$2.00

W. L. PARKER, Farmington, Minn.:		
Duchess of Oldenburg apple....	2d.	\$1.00
Wealthy apple.....	1st.	2.00
Lieby ".....	1st.	2.00
Longfield ".....	2d.	1.00
Haas ".....	1st.	2.00
Borovinka ".....	2d.	1.00
Charlamof ".....	3d.	.50
Patten's Greening apple.....	1st.	2.00
Transcendent ".....	3d.	.50
Virginia ".....	3d.	.50
Powers ".....	3d.	.50

Variety.	Premium.	Amt.
Briar's Sweet apple.....	2d.	1.00
Hyslop	1st.	1.50
Whitney's	1st.	1.50
Early Strawberry	2d.	1.00
Minnesota	2d.	1.00
Desota plum.....	2d.	1.00
Wolf	2d.	1.00

Total \$21.00

WM. SOMERVILLE, Viola, Minn.:		
Collection of apples (prof.)....	2d.	\$25.00
" hybrids	3d.	6.00
Tetofsky apple	3d.	.50
Duchess of Oldenburg apple...	2d.	1.00
Lieby apple.....	2d.	1.00
Longfield	2d.	1.00
Gilbert	2d.	1.00
Autumn Streaked apple.....	2d.	1.00
Red Queen	2d.	1.00
Rollin's Prolific	3d.	.50
" Russet	1st.	2.00
" Pippin	3d.	.50
Good Peasah	2d.	1.00
Antinovka	2d.	1.00
McMahon's White	2d.	1.00
Powers apple.....	2d.	1.00
Whitney's	3d.	.50
Florence	2d.	1.00

Total \$46.00

ALFRED SHERLOCK, Excelsior, Minn.:		
Duchess of Oldenburg apple...	2d.	\$1.00
Wealthy apple	3d.	.50
Martha	1st.	2.00
Agawam grape	3d.	.50
Brighton	3d.	.50
Concord	2d.	1.00
Duchess	1st.	2.00
Iona	2d.	1.00
Worden	2d.	1.00
Weaver plum.....	1st.	1.50

Total \$11.00

Variety.	Premium.	Amt.
JOHN VASATKA, Minneapolis, Minn.:		
Collection greenhouse and hot-house plants.....	3d.	\$20.00
Collection foliage plants, etc.....	3d.	10.00
" climbing vines.....	2d.	2.00
" coleus	1st.	5.00
Begonias (double).....	1st.	2.00
Geraniums in bloom.....	1st.	5.00
Collection geraniums.....	1st.	3.00
Asters	2d.	2.00
Gladioli.....	1st.	3.00
Twelve-inch basket of flowers.	3d.	3.00
Pyramid bouquet.....	2d.	2.00
Hand	2d.	2.00

Total \$59.00

R. WESSLING, Minneapolis, Minn.:		
Collection greenhouse and hot-house plants.....	2d.	\$30.00
Collection foliage plants, etc.....	1st.	20.00
Single specimen palm	1st.	3.00
Geraniums in bloom	2d.	3.00
Collection cut flowers.....	1st.	10.00
Roses, six varieties.....	3d.	2.00
Pyramid bouquet.....	1st.	3.00
Hand	1st.	3.00
Bridal	1st.	3.00

Total \$77.00

CLARENCE WEDGE, Albert Lea, Minn.:		
Wealthy apple.....	2d.	\$1.00
Lieby	2d.	1.00
Longfield	1st.	2.00
Elgin Beauty	3d.	.50
Charlamof	1st.	2.00
Antinovka	1st.	2.00

Total \$8.50

W. S. WIDMOYER, Dresbach, Minn.:		
Utters apple.....	1st.	\$2.00

THE NURSERY LAW PRONOUNCED UNCONSTITUTIONAL.

IT IS NOT APPROVED BY JUDGE SANBORN.

"The Minnesota statute relating to nursery stock received a severe blow when Judge Sanborn, sitting in the United States circuit court, heard the application for a writ of habeas corpus made by C. H. Schleichter. The appellant was committed to jail under the nursery law in Freeborn county. The court held that the law in question imposes restrictions upon the free sale of the product of another state and, therefore, is in opposition to the constitution. It is imposing vexations upon the men engaged in the sale of trees, shrubs, etc., the product of other states, and, therefore, a violation of the constitution. The trees grown in Illinois are entitled to sale on the same grounds and as freely as those grown in Minnesota. This law does not give to citizens of other states the same privileges given to the dealers of the same article in the state of Minnesota."

COMMENT ON THE ABOVE.

The law which for the past ten years has acted as a check upon fraud in the sale of nursery stock through agents, has lately passed under the ruling of the United States court and been declared unconstitutional and void. Those of us who are acquainted with the needs of our state and with the varieties sent out by Eastern and Southern nurseries, know that for the proper protection of our hor-

ticultural interests there is a necessity of some restraint upon the sale of such stock. As the grounds for the above decision was the fact that the law in question discriminated against property from without the state and thus infringed upon the constitutional right of congress to regulate interstate commerce, it seems to me that our next legislature should be asked to pass some law that would apply equally to all nurseries selling nursery stock through agents. It would not be burdensome to our home nurseries to furnish bonds similar to those required by the old law, and it would limit somewhat the flood of irresponsible salesmen sent out by firms so distant from us as to be also, practically irresponsible. The bond requirement would also, as in the past, keep out the greater share of swindling sharpers like the "budded tree" men who have recently been working in southern Minnesota.

It seems to me that another provision might be added that would, with proper agitation by our people all over the state, soon lead to the planting of a better and hardier class of fruit trees; and that is, a clause requiring that every apple, pear, plum and cherry tree, sold through agents, shall have attached to it a zinc label stamped with the name of the state where the same was raised. Small fruits, berry bushes, roses, grapes and like half-hardy stock, would not need any such limitation as they nearly all require winter protection of some kind. But the mere fact that an apple tree has been successfully grown in the this state, while not conclusive, is very excellent evidence that it is of a variety likely to succeed here; and it would not be long before the average buyer would be shy about accepting any other. This is not a matter upon which I have spent much thought, and there may be serious difficulties in the way of its practical adoption, but for one, while I am not a believer in too much paternalism in government, I am earnestly of the opinion that our tree planters are justly entitled to a reasonable legal protection from the frauds and impositions that are so easily perpetrated in the nursery business.

CLARENCE WEDGE.

What are the views of others on this subject? It would be well to present them in a subsequent issue and consider this well previous to our annual meeting, since the legislature meets this winter.

SEC'Y.

TO FRUIT GROWERS.—The undersigned member of the State Horticultural Society, and one of the committee on apples, respectfully asks any person living in the southern part of the state, who has seedling apple trees in bearing, or other trees that bear fruit of more than ordinary merit, to write his address and some facts concerning the merits of his fruit to me, with a view to bringing it before the society. Papers in the south half of the state favorable to the cause of horticulture, please copy.

J. S. PARKS,

Pleasant Mound, Blue Earth County, Minn.

(Published by request.)

Secretary's Corner.

NORTHERN IOWA HORTICULTURAL SOCIETY.—The annual winter meeting of this society will be held at Mason City, Iowa, Nov. 27-29, 1894.

PROGRAM FOR OUR WINTER MEETING.—Have you any subject you would like to discuss or hear discussed at that time? Please advise the secretary at an early day. It meets Jan. 8-11, 1895.

MISSOURI STATE HORTICULTURAL SOCIETY.—This society meets at Trenton, Mo., Dec. 5-7, 1894. Missouri is becoming one of the great fruit growing states and its society is in a very prosperous condition. A large meeting is expected.

FARMERS' INSTITUTES.—Mr. P. V. Collins, manager of "The Northwestern Agriculturist," has written to this office inquiring as to the advisability of putting two or three corps of farmers' institute instructors in the field, instead of one. What are the objections to increasing this valuable service? What do the members of this society say?

IOWA STATE HORTICULTURAL SOCIETY.—Their annual meeting will be held at Des Moines, Iowa, Dec. 11, 1894. Prof. J. L. Budd writes that on account of his health he will be south this winter, but Prof. N. E. Hanson (who will be remembered as the delegate at our last winter meeting) will act as secretary pro tem. Both this and the northern Ia. society have promised to send us delegates at our next meeting.

OUR FLORA.—A new number of the Minnesota Botanical Studies, published under the supervision of the state botanist, Prof. Conway MacMillan, contains three articles of special value to the people of the state. One is by Francis Ramaley, on the grasses of Minnesota; another is by E. P. Sheldon, and is entitled, "A Preliminary List of the Astragalus of Milk Betch"; and the third is a description of the black molds of North America, written by Roscoe M. Pound, of the Nebraska botanical survey.

OBITUARY.—Dr. L. N. Sharp died at his residence in Minneapolis, Friday, Oct. 19, 1894, aged 62 years. He has held important positions in the colleges here, among them the chair of surgery in the College of Physicians and Surgeons; was the founder and president of the Minnesota College of Pharmacy, and held the chair of pharmacy. He also held the chair of sanitary science in the Minnesota College hospital, and has been connected with the hospitals of the city.

Dr. Sharp has been for several years a member of this society and was much interested in its work, being a quite regular attendant at its meetings. The hearty sympathy shown by such as he is of inestimable value to the workers in this or any cause. He will be most kindly remembered by those who knew him best.

THE MINNESOTA HORTICULTURIST.

VOL. 22

DECEMBER, 1894.

NO. 11.

Floriculture.

PLANT ROOM FOR THE HOUSE.

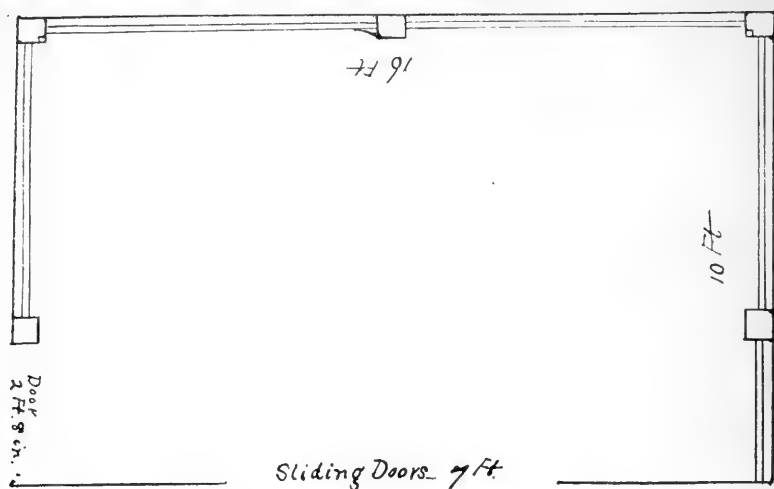
J. M. UNDERWOOD, LAKE CITY.

You have all noticed, no doubt, the inherent desire on the part of most people to keep plants in their houses, and with varying success are their desires gratified. In what I shall say on this subject, I shall hope to point out a way whereby this praiseworthy ambition can best be realized.

To keep plants in the windows of our living rooms requires much extra work. The proper temperature cannot be easily maintained, and, as the plants need the best position in the sunlight, they really make their best appearance to the passer-by and their worst to the inmates of the room, disarranging more or less the harmony of the furnishings. Experience and observation have taught me that there is an easy remedy for these difficulties, and it is this: Select, if possible, the sunny side of the house. If it opens into the parlor, sitting-room or dining-room, it will be best; but it is also a pleasant adjunct to a bedroom. If, however, you must have it open into some room on the east, west or even north side of the house, you can have a very nice plant room, but you will have to grow those plants that are most prized for their foliage, as only the south, or sunny, side can insure you a profusion of flowers. However, not even flowers are more beautiful to me than the lovely ferns and begonias that thrive best out of the sun.

Having decided on the location, a good size to build is a room ten feet wide and sixteen feet long. If it can go into an angle of the house and open into two rooms, so much the better. No matter if there is a door or window in the way, for they can open into the room and should be converted into double glass doors that can be opened or shut as desired. Build the foundation to correspond with that of the house and fill in the space with earth to within four inches of the top. On this lay grout, made with cement and coarse sand or gravel, and finish the surface with Portland cement or tiling, but having it come as high as the floor. The surface can be made to

pitch to one corner so as to carry off surplus water, although evaporation will likely care for all you put on.



The house supports one side of the roof and two corners, and three center posts the other side and ends. Between the posts and between the corner posts and the house fit double sash, each the full size of the space, the inside one to be permanent and the outside one to remove like a storm window. The glass can be any size you choose, according to the size of the space to fill. On one end and next the house put a small door opening out-doors or on to a porch, with a storm door for winter. Provide for ventilation by a sliding pane of glass in one corner, opposite the small door. Next place loose benches around the inside on the cement floor as high as the lower edge of the glass, and three feet from the floor another shelf, and two and one-half feet above that another shelf.

To heat this room you put in a radiator or flue, where you have a furnace, or, if stoves are used, you can easily heat it by opening the doors into the room where a good fire is kept. We heated ours at one time by a common stove in the sitting-room and never lost a plant by freezing. If you have waterworks in the house, attach a hose with a Vermorel nozzle for spraying the plants; but a common force pump will answer every purpose. You will find it delightful when the ground is covered with snow, and nothing but bare limbs on the trees greet your eyes, and not a blade of green grass to be seen, to go into the plant room and spray the plants, that nod their grateful appreciation and fairly leap with joy for their refreshing bath. Then, too, you get the delightful fragrance that is so noticeable after a warm spring rain. The earth in the pots gives the same rich odor that one gets from the fresh plowed ground. You forget for the time that it is winter, and nothing on the place will give you half the pleasure for the slight expense.

The main points I wish to make are that a person in moderate circumstances can afford to have one, that they add greatly to the

beauty and pleasure of home life, the plants do better cared for in one than in a living room, that they can be attached to any house and should be an adjunct of every farmhouse, no matter how small it is. The "Irishman's shanty" would be made lovely by the addition of a plant room.

Cost of the Structure.—I have asked an architect and carpenter to make me a plan and estimate, which I herewith submit:

ESTIMATE.

1½ cord stone, lime, sand, labor.....	\$18.00
1 barrel Portland cement, sand, labor.....	10.00
Sills, posts, casings.....	5.00
1 door, \$4.50; 1 door (storm), \$2.25.....	6.75
1 set sliding doors, 7 x 7-6 x 1½.....	35.00
Material for roof, ready to cover; 2 days' labor on same.....	14.00
Ceiling.....	7.50
2 squares of tin and labor.....	14.00
Sash @ 17 cents a light (172).....	24.24
46 lights, 15 x 26, A, @ 17 cents.....	7.82
46 lights, 15 x 26, AA, @ 20 cents.....	9.20
40 lights, 16 x 26, A, @ 19 cents.....	7.60
40 lights, 16 x 26, AA, @ 22½ cents.....	9.00
43 pounds putty, @ 5 cents.....	2.15
Glazing.....	10.00
Painting, 130 yards, @ 16 cents.....	20.80
Total.....	\$205.06
Use A glass on inside sash.	
Use AA glass on outside sash.	

This is for a first-class addition to any house that is worth from \$1,000 to \$10,000, and contemplates having it built upon contract. It could be made much more expensive, or a person could do a good share of the work himself, such as building the foundation, making the cement floor and doing the glazing and painting. The roof could be covered with three thicknesses of tar felt paper, using equal parts of coal tar and resin to cover it with, over which put on gravel, and so make the best kind of a roof and save \$10 on expense. The plan provides for rolling glass doors, but they could be left out and oil-cloth curtains made to roll up and let down when spraying the plants, at a saving of \$30; so that, with these alterations and doing what is suggested oneself, it would save a cash outlay of about \$88 and bring the cost within \$125.

Let me add a word about the plants. Study to find out what will do the best with you, and confine your selection to a few kinds, but have a plenty of them. I would rather see a plant room full of one kind of plants that were fine specimens of their kind, than an indiscriminate jumble of all sorts, from the ugly growing night-blooming cereus to a fern. This is twice, I think, I have referred to ferns in this article, and now I will speak about them for the third time. What is there more lovely? They thrive well in partial shade, and I would like to see a plant room with nothing else. With ferns and the fragrant bulbous plants, sacred lilies, freesias, tuberose, hyacinths and such, I could be supremely happy. Do not try to grow roses, unless you have an abundance of sunlight.

In conclusion, let me propose to the farmers who chance to read this article, that if you have kept your fruit garden in good condition, you can sell enough surplus from it in one year to build this addition to your house, or your wife can raise enough chickens and turkeys to do it. I am not particular how, but *get it*.

Pres. Underwood: In connection with this subject of flowers, I feel interested in stimulating a particular scheme of mine. I have tried to get all the talk out of you I could and not say much myself, but just now I want to say something about this scheme of mine. How many are there here that have a plant room to the house? I am going to make the statement that every house that is built ought to have a plant room. I mean a room distinctively for plants, and I am going to make the proposition that you ought to keep your plants in one room, and that that room ought to be built on every house. The executive committee thought that because I had something to do with building a couple of new greenhouses last year I ought to know all about greenhouses, so they put me on the committee on horticultural structures and greenhouses. I suppose they thought a man knew more when he started in on a thing than he did five or ten years later. All I wish to say, however, on that line is on plant rooms, and I think I do know something about that subject from the experience in my own home during my married life.

GREENHOUSE AND BEDDING PLANTS.

M. E. POWELL, ST. PETER.

Being requested by the society to write on the above subject, I confess I am greatly embarrassed, and fear that my comments will, to you, seem "warmed over," and simply a repetition of what we all know; that many of the florist members of the society could do the subject more justice, from their long experience and more thorough knowledge, is beyond dispute.

In the limited time we have for the presentation of the many varieties grown, the descriptions must, of necessity, be condensed. A botanical classification would be useless, and long lists are very confusing, therefore my aim is to describe only those varieties having distinct characteristics.

Roses.—The first, of course, is the rose, which is the most popular flower grown, and which is mentioned in the earliest sacred writings. Of its primitive history and culture we are in profound ignorance, also as to the origin of some of our most highly prized varieties.

It is with hesitation that I give a list of a few of those most grown at the present time, as introductions of new kinds, known as the finest today, will, very likely, be discarded and deemed unworthy of cultivation in a few years.

The following is a partial list of those now considered best; *Perle des Jardins*, *Waban*, *Madam Hoste*, *Souvenir de Wootton*, *Catherine*

Mermet, Bride, Papa Gontier, Madam Cuzin, American Beauty, La France, Meteor, Bridesmaid and many more of merit.

Carnations.—Next to the rose, the carnation is the most esteemed by the flower-loving public. There is no disputing the demand of the people for this beautiful flower. It is easily forced to perfect its flowers out of its natural season, and does best in a low temperature. The greatest difficulty in house culture is that the atmosphere is too dry and warm for it, and the result is that the little joker, the red spider, gets in his work to perfection.

According to our best known writers, the carnation has been cultivated more than two thousand years, but it has been improved by hybridization within the last fifty years, so that now our specialists in carnation growing claim that the ideal is almost reached—large flowers, that do not burst the calyx; long stem, with but one flower; luxurious foliage, unrivalled in the wide variety of its rich tints; exquisite fragrance; and, lastly, durability. So that in the esteem of lovers of flowers, it is close beside the rose.

Violets.—The demand for violet flowers during the winter season in Minnesota is very small when compared with that of the Eastern states; some growers there make it their exclusive business. It is not always a success with every one attempting it.

Some varieties are hardy in Minnesota, blooming in the spring, requiring partial shade in the summer and a slight covering of leaves in the fall.

Primroses.—These rank high as house or greenhouse plants. They are of easy culture, and are always grown in pots of a size to correspond with the degree of vigor of the plant.

The double white is the most prolific of all, and the single flowers run through all shades from deep carmine to white.

Bouvardias.—These are also grown in immense quantities, but not so much as in days gone by. They are of easy culture, and do well in warm dwelling-houses, if the temperature at night is kept at from 55 to 60 degrees. The flowers are borne in great profusion; the foliage is a bright glossy green. Colors range from beautiful carmine to white, and flowers both double and single.

Heliotrope.—Indispensible for bouquets and vases of flowers. Their rich purple and lavender tints and exquisite perfume are familiar to all. They bloom during the entire season, if not allowed to become pot bound; they require plenty of water and a rich porous soil.

Begonias.—All the species are interesting, either as pot plants or for bedding out. Begonias are of the simplest culture in any rich soil, if given an abundant supply of water.

Some of them have large showy flowers, white; others of the rex type are much admired for their beautiful foliage.

Fuchsias.—There are but few varieties which bloom freely, and two year old plants flower the best. They can be trained to any desired form to make ornamental specimens, and can be procured with single or double flowers, of which the double whites and deep purples are very fine.

The *Calla Lily*, so well known, is a native of the Cape of Good Hope and easily cultivated.

The only particular attention it requires is plenty of water, a warm place when coming into flower and an occasional syringing of the leaves to keep them free from dust. There are several species, all requiring the same treatment.

The *Chrysanthemum*, well named the "Queen of Autumn," is not the flower of our grandfathers' day, but so much improved by experts in hybridization that it is now the acme of perfection, combining wonderful size with remarkable vigor and splendid form. It is indeed difficult to imagine anything more beautiful. Many bright colors and intermediate shades have been added to the list in the last few years. From the almost numberless varieties now grown, it is not easy to select those which will give the best results, as those which do well in one locality are often useless in another. All we can do is to try, and in that way find out which does the best with our soil.

They are divided into three classes: Chinese, with large regular shaped flowers; Japanese, whose blooms are large, irregular, fringed and fluffy; and Pompon, with small compact flowers.

We might mention many other plants grown in the greenhouse, which are well worthy of more general cultivation, and the numerous bulbs which produce flowers, which are highly esteemed by all lovers of the beautiful.

Bedding Plants.—It is not my desire to give a complete list of all plants used in bedding, but only those most generally used and of tried varieties.

As to the selection of plants, it is best to tell your florist what kind of a bed you want, and let him use his own judgment. Our experience has been that the average purchaser is very much in need of information, and is often misled by the glowing descriptions annually pictured in many of the elegant flower catalogues which are sent broadcast over the country with their wonderful novelties.

Our advice to buyers would be to let that neighbor of yours experiment with the new varieties; to avoid the very common mistake of planting too many colors in one bed; not to be afraid of getting the soil too rich, or of giving them too much water, if you have a sandy soil.

Bedding is a term used by florists when plants are set out in what is known as "Carpet," "Ribbon," or "Massing in Color."

The carpet style is that of planting low-growing plants to form carpet-like patterns, and must be made of such plants as present a smooth, well-defined color, not to exceed four inches in height, set close together, covering up the soil completely. The plants most used for this are, *Sedum*, *Echeveria*, and *Sempervivum*.

Bedding in ribbon lines, is usually done along the margin of walks, in different widths, from three to ten feet, as desired; the plants to form a slope to the walk by planting the highest at the back, with the lowest growing in front. Or, they may be planted in a circular bed, the highest plant or plants in the center, and so on, in circles of lower growing plants to the margin. To keep the plants of each color well defined and smooth is the idea; they will need constant care in pinching back and clipping.

The plants used for the above work are different colored coleus, edged with any of the following: *Centaurea*, *Cinneraria Maritimi*, or *Alternanthera* of various colors.

Bedding by massing in color consists in contrasting masses of color in flowers or foliage in any number of shades desired, but the effect is best when but few colors are used in one bed.

Large beds are very pleasing when formed of one shade, such as scarlet, pink, chocolate or yellow, and contrast nicely with the green of the lawn. They are more admired by people of taste than when so many different colors are placed together.

Among the many plants for bedding, there is none better for flowering than some varieties of the *Geranium*; in its almost endless shades and colors, it certainly seems that the most critical could be suited.

Pansies, *Verbenas*, *Petunias*, *Feverfews*, *Salvias*, *Caladium*, *Esculentum*, *Lobelias* and *Cannas*, are all used for the decoration of the flower garden and lawn.

For several years there has been an ever-increasing demand for low-growing, large-flowering *Cannas*, and certainly there can be nothing more beautiful than a bed of these, with their immense foliage and many flowers of vivid hue.

THE CHANGING FASHION IN CUT FLOWERS.

F. G. GOULD, EXCELSIOR.

We know from history that roses have been considered, and have really, perhaps, stood at the head of the list of flowers for some centuries; but in this country, at least, the improvement in fruits and flowers has been stimulated most in the last thirty years. Flowers have not been used for commercial purposes in this country to any extent until since the war of the rebellion, thirty years ago, and most of that in the last ten years. Now, the fashion in flowers, perhaps, is governed by the same rules that all of our habits are affected by. Frequently fashion has considerable to do with the demands for flowers of different varieties. I remember distinctly twenty years ago or more roses, really, had not yet become an article of commerce in this country. I remember at that date the camelia was the principal flower, and the buds sold for fifty cents apiece.

Now, the carnation was scarcely known as a commercial flower twenty years ago in this country. About that time, it was beginning to be grown to some extent. Though they have been for centuries one of the most desirable flowers, at first they had but five petals, a single flower, but at that time they had that delicious clove fragrance, and they were not only agreeable to the sense of smell but they were of the quality that lasts—at any rate, they have been regarded as one of the most useful and beautiful of flowers. The fragrance is different, perhaps, from the fragrance of most flowers, even roses, it has a stimulating effect, and a person does not tire of it. They

can be used in the sick room. Now, at the present time the carnation happens to be the most valuable, I might say the most fashionable, flower. They are most used at present, and there are good reasons why they should be used now, if they are desirable. They last twice as long as roses with the same care; they are cheaper and almost as large. As I said at first, they originally had only five petals, but now they have anywhere from twenty-five to fifty. Some of the other flowers that were fashionable a few years ago are scarcely used now. Among them I might mention tuberoses. I think a tuberose has a very offensive fragrance. They are used very little at present; they were used much five or six years ago.

The narcissus is now used largely, the choice paper white and the yellow, and the last is really more yellow than it used to be. The sunflower age developed this last among the people. Violets seem to hold their own, perhaps, better than any other flower. There is an immense quantity of violets used, still they are not so general, perhaps, as roses and carnations.

WINTERING GERANIUMS.

In its natural state the geranium is a plant which is never wholly at rest; it is, however, very amenable to treatment in cultivation and very patient with bad usage. The proper treatment for bedded plants intended for another season's planting is to take them up carefully and pot or plant in boxes, and stand in a light place in a temperature secure from frost, yet not high enough to excite active growth. Under these conditions a very little water would be sufficient during the cold season. When the weather becomes milder in the spring, and plants start to grow, care for them properly, regulate the growth and disposition of the branches, and thus prepare them for planting at the proper season. But one may not have the facilities to care for the plants in this manner, and yet want to preserve them. A damp cellar is not a suitable place, and may cause them to mould and decay. The plants when taken up can be placed in boxes, most of the foliage be removed, and soil be made only a little damp; then place the box or boxes in a dry frost-proof cellar where there will be some light. The leaves will soon all fall. By the first of March it will be best to place the boxes containing the plants in the window of a moderately warm room, and give water and start the plants into growth. Some leave the plants in the cellar until the weather is warm enough to set them out; but they are then in a very enfeebled state, and it takes a long time for them to recover.

TOMATOES UNDER GLASS.

A successful enterprise at Grimsby, Ontario, is the growing of tomatoes under glass. Two large greenhouses, 200 ft. long, have been erected for this work, and for two or three seasons past they have been shipping beautiful large tomatoes to the city markets, at from 30 to 50 cents a pound. Each tomato is carefully wrapped in tissue paper, on which is stamped the grower's name. The "Garden and Forest" notices these fruits as coming into the New York market.

Entomology.

A FEW ENEMIES OF THE PLUM.

PROF. OTTO LUGGER, ST. ANTHONY PARK.

DISEASES.

I suppose all persons hold the opinion that a ripe plum is a fine thing to possess, either to eat or to sell. When we consider that of all fruits the plum is the most promising one for this state, we can only regret that our success depends upon so many factors, and that it can not be attained without very much labor and patience. Yet I have no doubt that plums of superior quality and in large quantities can and will be raised in the future. To be successful in this work it is very important to know exactly what obstacles are to be overcome. Studying the question simply from the standpoint of an entomologist and botanist, such obstacles are chiefly parasitic plants and injurious insects; but as there are a large number of both diseases and enemies, I will only discuss a few of the more important ones.

THE BLACK KNOT OF THE PLUM AND CHERRY. (Fig. 1.) *Plowrightia morbosa* (Scher.) Sacc.)

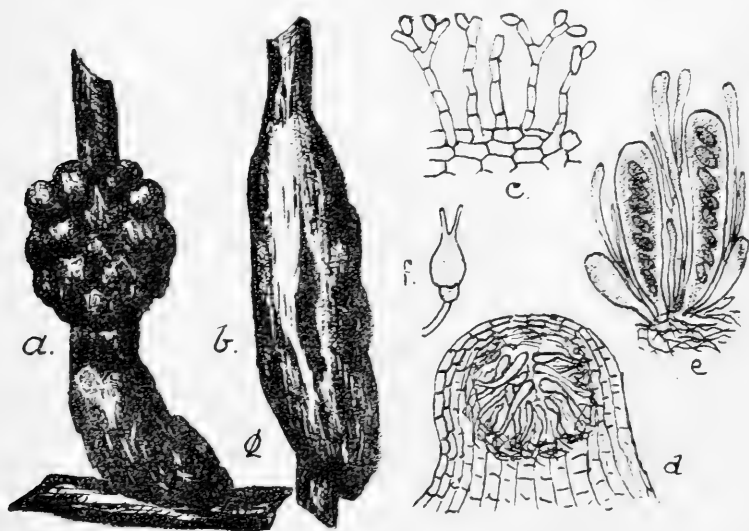


Fig. 1. BLACK KNOT OF THE PLUM AND CHERRY.—*a*, old knot; *b*, new swelling; *c*, summer-spores upon knot; *d*, cavity in old knot filled with threads and club-shaped bodies; *e*, formation of winter-spores; *f*, germinating winter-spores; *a*, *b*, nat. size; *c*, *d*, *e*, *f*, greatly enlarged.

There can be but few persons interested in horticulture, or even in a general way in plants, who have not seen to their dismay or to their astonishment that this disease is becoming more and more common, and that but few wild plum and cherry trees can be found which are not more or less disfigured by it. In the course of my numerous trips, both in Minnesota and elsewhere, I have made it a point to question people possessing such trees about the origin of the black knots, and have almost invariably received the reply that it was a diseased condition of the sap, or that it had been caused by an insect or by some other mysterious being. Some tried to prove their case by cutting open the more recently infested twigs, and as a general rule succeeded in uncovering some insects, and, presto—cause and effect were proven beyond any doubt whatever. Quite a number of insects utilize the succulent swelling first produced by the disease and revel in its interior, sometimes to such an extent that after leaving the twig there is little else left of the original swelling than a loose and more or less twisted layer of bark. Among other insects the genuine plum curculio infests such swellings, and they were bred from them as early as 1818 by Peck.

But, notwithstanding all such evidences, the swelling is produced by a fungus, recognized and described in 1831 by de Schweinitz. More recently the whole matter has been settled beyond any doubt or dispute by the careful researches of Dr. Farlow, who followed all the metamorphoses undergone by the fungus in its host; he discovered also the various spores of the fungus. It is strictly of american origin and has not yet been introduced into Europe, like so many others. All kinds of wild plums and cherries are affected, but cultivated varieties do not escape, though the fungus seems to attack certain varieties of plums by preference. Notwithstanding the claims of originators of disease-proof varieties, their claims are of no value when tested over a more extended region.

The first indication of the disease can be noticed in the autumn as a slight swelling of the branch near an old knot (Fig. 1, *a*), sometimes even some distance away from it. In the former case it is probably caused by an extension of the vegetative mycelium in the old knot; in the latter, it is a new infection by spores. When we cut through such a young knot we can observe that the bark, and chiefly the inner bark (Phloëm), has become swollen, and in it may be seen the bundles of intertwining threads of the fungus. During the following spring these knots or swellings enlarge more and more until the epidermis ruptures and a dark, greenish-brown mass of tissue protrudes, evidently caused by an abnormal growth induced by the fungus (Fig. 1, *b*). This mass is quite firm and succulent, with an irregular and somewhat cracked surface, quite inviting to many species of insects. Late in May, we can observe upon the surface of this mass very numerous erect threads (Fig. 1, *c*), which give it a darkbrown velvety appearance. Upon these threads the roundish summer-spores of the fungus are produced, which are of a brownish color. Later in the season both threads and spores disappear, the knot is no longer velvety, but becomes black, hard and dry—in fact, is dead. Its surface is now divided into small

roundish spaces, each with a slight depression in the middle. If we make a section through the knot a year after it could first be seen (in the fall), we can see under each roundish space a white spot, which indicates a cavity in the black tissue of the knot (Fig. 1, *d*). This cavity is filled with slender, colorless, microscopic threads. Later club-shaped bodies (Fig. 1, *e*) appear among these threads, in which are produced eight colorless winter-spores, which ripen and are able to germinate about the end of January or February. These winter-spores eventually escape and carry the disease to other plants of the same genus. Such winter-spores (Fig. 1, *f*) I have repeatedly sown in water, and they begun to germinate very quickly, growing into germ-tubes. Some brown spores found with the winter-spores grew even more rapidly and became quite long in two days. Summer-spores sown upon gelatine change to an elliptical form, germinate and produce a felted patch; later this becomes dark, and soon afterwards forms erect threads, bearing spores.

As this disease is caused by a plant fully as injurious to the horticulturist as the Canada thistle and Russian thistle is to the farmer, there is no reason not to have some laws enacted to prevent its further increase and injury. The knots are readily seen, and can as readily be removed; and as by removing and burning them we can soon control this vegetable pest, it is about time that we should have laws to that effect and enforce them rigidly.

PLUM POCKETS, OR BLADDER PLUMS (Fig. 2).
(*Taphrina pruni*, Tul.)

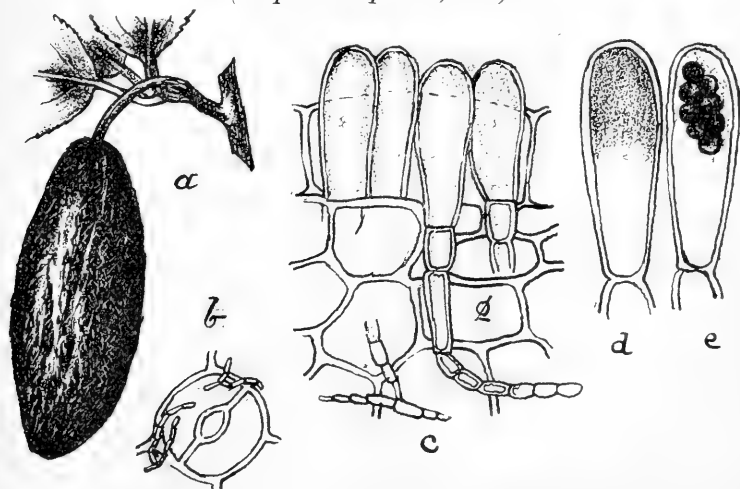


Fig. 2. PLUM POCKETS, OR BLADDER PLUMS; *a*, bladder, nat. size; *b*, mycelium entering plant; *c*, mycelium forcing its way through epidermal layer; *d*, *e*, asci; *e*, spores, all greatly enlarged.

There are few diseases of plants which attract so much attention as this one. Wherever plums are grown, both of the cultivated and wild kinds, this disease appears from time to time, not seldom destroying the whole crop. As very often small reddish maggots occur inside these bladders, many people imagine that insects have

been causing such gall-like swellings. But this is not the case, as these insects, the larvæ of small flies, have simply utilized the diseased condition of the plum for their own use. The bladders, or pockets, (Fig. 2, *a*) are caused by the presence of a parasitic fungus which attacks the young plum and, by growing inside its tissues, causes the peculiar growth. It is really strange that until quite recently very little of a definite character was known about the pockets, though they were described as early as 1593 by Casalpini. For a long time many theories were advanced to account for their formations, such as insects, improper fertilization or too abundant moisture at the time of setting of the fruit. Fuckel discovered the true cause in 1861, and a few years later it was thoroughly studied by De Bary.

Here in Minnesota the pockets appear soon after flowering, grow rapidly and drop from the trees towards the end of June. First, almost globular, they soon assume an oblong, oval, twisted or curved shape. They are very variable in size, and some grow to almost two inches in length by an inch in diameter. At first they are smooth, resembling the healthy fruit, but differ from it by a yellowish or reddish color. I recollect the time when, as a boy, myself and other youngsters peeped into every tree to find such bladders, as they were considered great delicacies; evidently, a depraved taste based upon ignorance of the cause that made them. When the pockets reach maturity their color gradually changes to gray, produced by fine gray powder dusted over them, and later they turn to dark brown or black. In this condition they soon become hard and drop.

When we cut through such a pocket we find that the walls are quite thick, and that instead of a stone the cavity is filled more or less with the threads of a fungus. But this disease attacks also the younger branches and leaves, which also become contorted, turn gray and die toward autumn. One of the worst features of this disease lies in the fact that trees once infested are very apt to produce more and more bladders year after year, and that they hardly ever recover. Some varieties are less liable to the disease; it is very common upon the wild red plum (*Prunus Americana*), the dwarf cherry (*Cerasus pumila*), the wild black cherry (*Cerasus serotina*), and upon the choke cherry (*Cerasus Virginiana*).

A microscopic investigation will reveal three distinct organisms: *mycelium*, *asci* and *spores*. The former is a colorless bundle of filaments or threads; it is most readily seen inside the flesh of the pocket. From there the *mycelium* forces its way towards the surface, and by branching repeatedly forms a rather dense network between the epidermal cells and the cuticle, only one cell in depth (Fig. 2, *c*). The cells in this network are very short, soon start to grow at right angles, and so form small cylinders standing erect side by side. Before long the cuticle is ruptured and the cylinders appear upon the surface (Fig. 2, *d*, *e*). They are the immature *asci*, and are filled with granular protoplasm, which during growth passes into the free ends and becomes eventually separated by a septum. This separated portion is the true *ascus*. The protoplasm inside gradually separates into a number of spores, usually eight

(Fig. 2, c), which are colorless and globose. When ripe these spores rupture the free end of the *ascus* and escape, indicating that the fungus is only too able to propagate rapidly. When we look at the surface of a single pocket, we can observe countless numbers of *asci*, and as each contains eight spores, the propagation, and with it the distribution, is very rapid; and yet no one has been able to infect healthy plums with such spores. As the *mycelium* of the fungus can be detected in the smaller twigs of the tree early in the spring we can be certain that it can live in its host from year to year.

We have but one remedy that has proved to be effective, but it is one that requires much labor. If the bladders are removed while still young, and if we cut back the twigs and smaller branches, we can succeed in eradicating the disease in two or three years.

POWDERY MILDEW (Fig. 3.)
(*Podosphaera oxycantha* (D. C.) De Barry.)

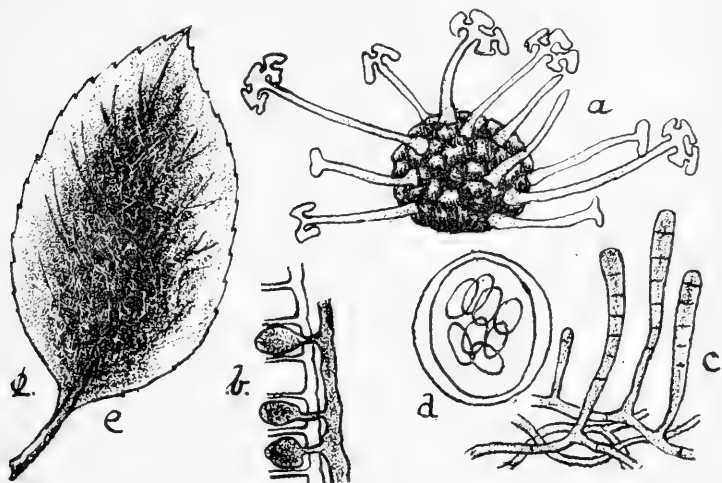


Fig. 3. POWDERY MILDEW; e, blotch of mildew, natural size; c, mycelium forming summer-spores; b, haustoria of mycelium abstracting cell-sap from leaf; a, perithecium; d, spore cavity: all enlarged.

This disease starts rather late in the season and is frequently very abundant in the latter part of summer and autumn. It appears as white blotches upon young leaves and tender shoots; these blotches (Fig. 3, e) spread rapidly and frequently cover the entire leaf. The threads, composing the blotches, branch and cross in all possible manner, and form a true felt (Fig. 3, c). The denser portion of it is covered with white powder and very minute, black, globular objects (Fig. 3, a). Both sides of the leaf are affected. Upon older leaves the injury is slight, but the growing tips and young leaves are ruined. This white felt is the mycelium or vegetative part of the parasitic plant. The threads that form it do not enter the host, but abstract food from it by small suckers or haustoria (Fig. 3, b). The spores (conidia, or summer-spores) form upon the ends of thicker branches (Fig. 3, c) and if they reach a proper place for germination, they start

a new fungus, and as they are very small the wind carries them readily from tree to tree. Later in the season other dark-colored spores are formed by true fertilization, which takes place when two threads cross each other (as seen in Fig. 4, *b*). The young perithecia, or sporocarps, are at first nearly colorless, then gradually assume a yellow, brown and nearly black color. Such a perithecium (Fig. 3, *a*) is spherical, flattened upon one side and covered with numerous reticulations, which indicate cells below them. Some reticulations produce peculiar and strangely formed appendages peculiar to powdery mildews. Each perithecium contains a single spore-cavity (Fig. 3, *d*), in which are eight spores. When this cavity breaks open in spring, the spores escape and start new colonies of disease-producing fungi.

All powdery mildews thrive best during a warm and dry summer. If such a dry spell is followed by a light rain, the disease appears everywhere as if by magic. Much and heavy rain has the opposite effect, as it washes down the spores or seeds of these plants. As such mildews thrive only upon the outside of their hosts, they are easily reached by fungicides. During the last summer the disease was very common upon a great variety of plants, in fact, nearly all the members of the rose family were more or less affected. As a number of shad-berries (*Amelanchier Canadensis*) were badly infested behind my house, I tried a number of remedies and found that powdered sulphur dusted over the diseased foliage destroyed all traces of the fungus. Some plants of spiraea, equally badly infested, were treated with a liquid fungicide in the form of a fine spray. *Potassium sulphide* or *sulphuret of potassium* proved excellent. One-half ounce of this substance was dissolved in one gallon of water. This fluid is also an excellent remedy against the gooseberry mildew, as I had an occasion to prove.

THE BROWN ROT OF THE PLUM-FRUIT. (Fig. 4.)

(*Monilia fructigena*, Pers.)

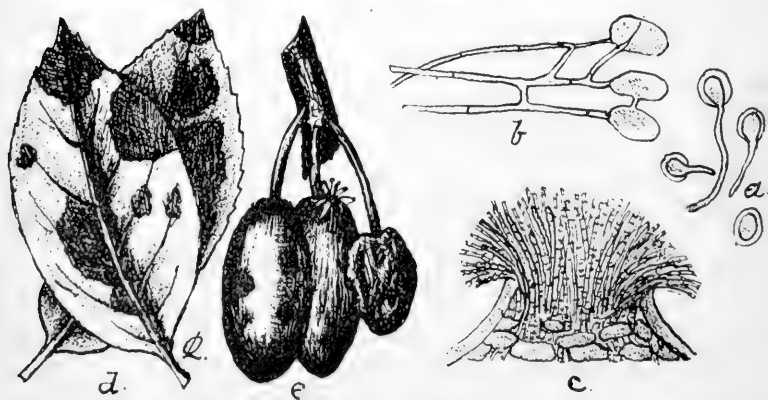


Fig. 4. BROWN ROT; *a*, *b*, germinating spores and mycelium; *c*, spores arranged in chains; *d*, diseased leaf; *e*, diseased fruit, and others in which the disease was produced artificially; *a*, *b*, *c*, greatly enlarged; *d*, *e*, natural size.

This disease is only too well known in its effects, as it sometimes causes an almost total loss of the peach, plum and cherry crops. At present it is not a common disease in Minnesota, though by no means an unknown one, as I have observed it upon wild plums, cherries and shad-berries in Otter Tail county and elsewhere. The disease is called brown rot, because the fruit becomes brown, skrunken and shrivelled, so that nothing remains but a tough skin enclosing the stone; and this sorry looking object, resisting further decay, remains for a long time hanging to the tree (Fig. 4, e). If we investigate the fruit before it becomes "mummied", or "mummy-fied," or before it turns brown, we can see its surface densely covered with tufts of ash-colored spores. The vegetative threads of the fungus extend through the tissues of the fruit, force their way to the surface, and produce spores arranged in chains (Fig. 4, c). As the disease is by no means a stranger in the orchards of the Experiment Station I have frequently used the microscope to study mummy-plums collected for the purpose from the trees or from the ground under them. Although apparently devoid of life and harmless, such fruits are most dangerous to the orchard. If we place one of them in moist surroundings we will perceive in a very few days that it is thickly covered with tufts bearing spores (Fig. 4, a, b), and these do not belong to fungi growing simply upon decaying fruit.

A microscopic study of the dry flesh of such a plum reveals numerous threads, which are composed of large and thin-walled cells, and it reveals also single cells with thick walls of irregular shape. These latter are evidently resting vegetative cells or gemmæ. They are well adapted to withstand the rigors of winter and will germinate as soon as conditions are favorable. Other investigations made in the house showed plainly that the spores appearing as chains upon the surface of the fruit during summer also germinated readily and produced spores again. These latter, as soon as they become detached, germinate again, and there is no doubt that their germ-threads can enter the skin of a fruit that is not injured, though as a rule there are insects enough to make openings for their entrance.

When such threads enter the tissues of flowers, leaves and tender twigs they spread rapidly and kill them (Fig. 4, ^ed). Later the threads force to the surface and multiply again. The fungus can be detected on the flowers at about the time that their petals drop. At first a slight discoloration appears and this rapidly increases until the flower becomes brown. Such dead flowers remain frequently upon a tree for many weeks, or until washed down by heavy rains. Whenever such rotten and sticky flowers come in contact with leaves, etc., they communicate the disease, and as a result the parts affected decay also. Upon leaves the fungus shows first as a slight discoloration which spreads gradually until the larger part of a leaf is involved and turns reddish-brown (Fig. 4, d). Both sides of the leaf are affected, though the upper surface seems more apt to be injured. During wet weather the infested leaves show numerous tufts of fungi, and they have a powdery or mealy appearance caused by the innumerable spores. During this period the parts affected are highly infectious.

The life history of this fungus may be summarized in a few words: The *Monilia* spores are perfectly able to multiply in many ways, and can enter the host. The resting cells or gemmæ in the dry fruit, still hanging upon the tree or laying upon the soil below it, winter over and start into fresh activity early in spring. The spores produced at that season can reach the plums just forming.

Upon the fact that such resting spores remain in the dry fruit depends the remedy; and the only safe one is to remove the dead and dry fruits from the trees or from the soil, and to burn them. A clean orchard is in this case, as in many others, a healthy one. All old leaves accumulated below and near the trees should be burned. As many spores live over winter in the cracks of the bark, spraying with a fungicide should be resorted to early in the spring. A solution of 4 lbs. of sulphate of iron in 5 gallons of water is recommended for this purpose. An application at the time of flowering, another one when the plums commence to form, and others at intervals of two weeks until the fruit commences to color, are necessary. These latter applications should consist of a solution of one-half ounce of sulphuret of potassium in one gallon of water. Judicious spraying will do good, but we can not expect everything from such a treatment.

OTHER DISEASES.

Besides the four diseases described thus far as very injurious to plum trees in Minnesota, there are others almost as destructive, at least in certain years. Such are the plum leaf-blights (*Cylindrosporium padi*), the plum rust (*Puccinia pruni-spinosæ*), the leaf spot, or gun-shot, of plums and several others. But the four kinds described will surely prove that plum trees are subject to many ills, and that we cannot expect to grow this fruit without working diligently to deserve a crop.

INSECTS.

When we discuss the various insects that contest with the horticulturist to determine who shall have the greatest share of the fruit, the aspect does not brighten. I have no doubt we all have among our friends some physician whom we like to see in our home, proving he comes as a friend and not as an M. D. I am afraid you entertain a similar feeling towards entomologists. They may be good fellows but you do not like their occupation, or, rather, do not wish to have them call at your place as entomologists. But since your energetic secretary has called upon me as an entomologist, he has to take all the blame if I hurt your feelings by making the statement that your plums are threatened, not with a few insects, but by a host of them. Nor are these insects of such a character that they are easily kept away from your trees, just on the contrary, they consider it their crop, grown especially for them, and, moreover, they do not intend to budge an inch until forced to do so. Some of our enemies among insects thriving upon the results of our labors are not easily dislodged, and it will take lots of ammunition and still more of active work to reduce them to such numbers as to become powerless to cause damages.

I have a list of over forty species of insects which are found in Minnesota, injurious to the plum. Many of them do not occur every year in large numbers, others are constantly present, but have to be favored by suitable conditions to exert their full powers as destructive insects, while others are common every year and take a large part of our crop. For this meeting I will mention only a few and give their life histories, which must guide us in choosing the remedies we can apply with success. To use insecticides at random does little good, and frequently more harm than good, and without knowing exactly the habits of our foes we cannot expect to conquer them. Besides, the plum is a tree that is very readily injured by all kinds of arsenical poisons, more so than any other cultivated plant we have in Minnesota. Moreover, the tree is at different times more readily injured than at others, and the use of any arsenical poison has to be restricted as much as possible and be guided with much caution, or instead of killing the insects, we kill the tree.

I had during the summer a very peculiar experience with a new insecticide sent out by a Chicago firm, of course, with the usual high sounding claims supported by many testimonials. The directions were given how to use this material; and as some trees in my yard had large numbers of leaf-lice upon them I was stupid enough to try an experiment upon my own trees. Result: living lice crawling away; leaves all dead; twigs and smaller branches, ditto; dead foliage of all kinds of plants as far as the spray reached; bad temper; bad language—but no testimonial for the firm expressed in the usual polite terms. Prof. Snyder, of our station, kindly determined the composition of the fluid and found it to contain about equal parts of soluble arsenous acid and caustic potash. The tin can containing the fluid, having been kept upon a painted porch, left a mark upon it by having eaten away the paint. The can was thrown away among rubbish in the neighboring woods, causing the death of several trees and of everything living in a radius of over four feet. Perhaps, some of you gentlemen will in future offer me the use of some trees for trial of new insecticides! If you do, please give me your address and a written release from all possible damages.

The four most destructive insects to plums and plum trees are *Plum Gouger*, *Plum Curculio*, *Plum Aphis* and *Plum Gall Mite*.

It is hardly necessary to speak in detail about the first two insects as they are too well known, and you can hardly open an entomological bulletin issued by any of the Eastern, Central or Southern states without finding a description of the one or the other, and of the remedies that will kill them. As far as such remedies are concerned I am afraid that much more is claimed for them than is warranted by facts. Now-a-days Paris green and Bordeaux mixture are a sort of cure-all, and all ills that plum trees are heir to are said to be cured by them. We could only be glad if such were the case, but the millennium has not yet been reached, and some of the older methods of fighting insects have to be used in addition.

The *Plum Curculio* (*Conotrachelus nenupher*) eats all tender parts of the tree, such as green bark, buds, leaves, flowers and fruit.

Early in spring it feeds upon the former, later upon the latter substances. Knowing this, we can kill large numbers of the curculios which appear early in spring, and we should apply the spray before the trees are in bloom. As the bee-keepers are also in session I will add here: Never spray trees while in bloom. The little Turk deposits eggs inside the fruit, and never upon it. Consequently, the larvæ can not be reached by any application of poison to the growing fruit. Yet as the beetles continue to deposit eggs for a long time they must necessarily take some food, and with the view of poisoning this food, at least two sprayings should be made after the fruit has set. Such spraying will kill also most other insects that enjoy the foliage of plums, and, consequently, is a very useful and necessary operation. Of course, we have to be satisfied with killing a large number of plum-curculios, but we cannot expect to eradicate them by such means. Either Paris green or London purple may be used; each has advantages and disadvantages. If we use the latter we should add an equal weight of quick-lime to prevent the injurious action of soluble arsenic. Every fruit-grower should have a good spraying machine, if possible with a Vermorel nozzle. One pound of either poisons in 175 to 200 gallons of water is an excellent proportion, providing the spraying is done so thoroughly that every part of the tree is wet.

"All fallen fruit should be picked up" is a rule that should be strictly followed. Those horticulturists that have time—if such persons exist—should also use the old remedy of jarring their plum trees early in the morning, and gather and destroy the insects that fall upon a canvas spread under it.

The *Plum-gouger* (*Coccotorus prunicida*) is also a snout-beetle, but has quite different habits and differs also greatly in appearance. The plum-gouger makes a deeper and smaller puncture in the fruit when depositing its eggs, and there is never an indication of the crescent-shaped cut so artfully made by the little Turk. Its larva is also never exposed, but instead of feeding upon the flesh of the plum, it feeds inside of the stone upon the flesh of the kernel. Inside this stone, it reaches the adult stage in the fall, while the mature larva of the plum-curculio leaves the plum and enters the ground for pupation. Removal of fallen plums is absolutely necessary to reduce the numbers of this insect. There is very little use in spraying; jarring the trees is the best method of capturing most of our foes. A closely allied species breeds in our sand-cherries; it has almost identical habits.

There is a remarkable difference in the egg-laying habits of the two plum insects, as you can see by studying the figure 5. I have also indicated the method that a third species of snout-beetle has in laying eggs in apples.

Plum-tree Aphis (*Aphis prunifoliæ*) and *Plum Aphis* (*Myzus persicæ*) both occur in Minnesota, but the latter is the more common and injurious. When numerous, these lice distort the leaves and tender twigs, and by clustering upon the young plums cause them to wither or become hard. As a general rule, they are well hidden in the curled leaves and are not readily reached by dry or wet insecti-

cides. As all leaf lice absorb their food by suction, contact poison is the only one of use, though finely divided arsenites will kill large numbers. The better method is a very forcible spray with kerosene-emulsion or with fish-oil soap. Even cold water applied forcibly will dislodge and kill many. As the formula for kerosene-emulsion has been given so frequently it is only necessary to state that two gallons of kerosene, one gallon of water and one-half pound of hard soap should be emulsified and added to twelve parts of water. This fluid will kill all lice with which it comes in contact. Whale-oil soap, at the rate of one pound in six gallons of water is also a very useful liquid; a strong decoction of tobacco might also be used.

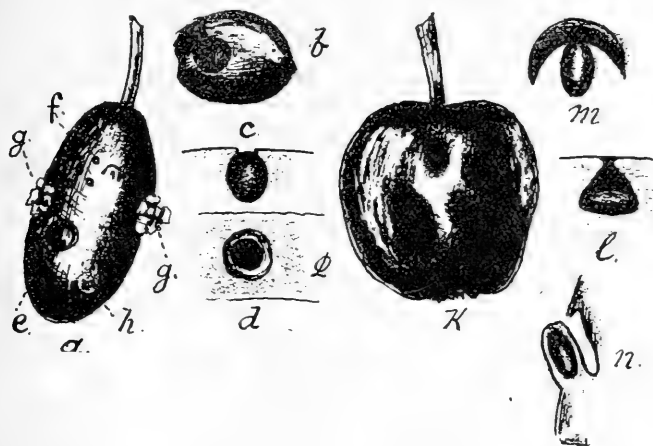


Fig. 5. a, plum in which eggs have been deposited; b, hole from which plum-gouger has issued (also e); c, d, egg of the same; f, punctures made in feeding by plum curculio; g, waxy secretion; h, work of the same; k, apple injured by apple-curculio; l, egg of same.

Plant-lice. During a dry spring and early summer, plant-lice of all kinds increase beyond belief, and if it was not for our many friends among insects that constantly wage war against the lice, it would be almost impossible in our dry region to protect ourselves against them. All leaf-lice increase in summer by budding, or by producing living young, and for many generations nothing but females can be found. Later in the season, or when the sap in the plants infested by them does not flow any more in such rich streams as earlier in the season, the lice become winged and search for places in which to deposit winter eggs for another season. (Fig. 6, d.) They usually select for this purpose the terminal twigs of the tree, and prefer the fuzzy scales of the buds. Here immense numbers of eggs are laid, not alone by the lice under consideration, but by other species as well, as, for instance, by the hop-louse. At first green, these eggs gradually assume a darker color, until at last they are shiny black, and are thus readily detected. Such eggs, shown in the accompanying figure, are surrounded by a tough integument, and are not so easily killed by insecticides. Several thorough coatings with soft soap

during fall, winter and early spring will kill the great majority; and this method of fighting such lice is by all odds the best in Minnesota, and by doing so, we can eventually kill them root and branch. The peculiar honey-dew, largely produced by these insects early in summer, frequently coats all the leaves, and as it is a fine medium for the growth of some fungi, the leaves soon appear as if coated with soot.

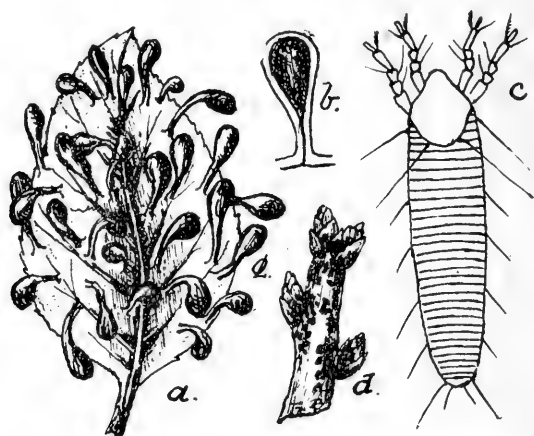


Fig. 6. a, PLUM GALL MITE; b, section through gall; c, gall-maker; d, winter-eggs of PLUM APHID; a and d, nat. size; b and c, greatly enlarged.

The Plum Gall Mite, (Fig. 6, a, b and c) is produced by a very minute mite (Fig. 6, c), a member of the order of spiders. It is not a true insect. As you all know, spiders differ from insects by having eight, not six legs, by having the body into two parts, not into three, as in the case with insects. Mites again are separated from spiders in not having a deep constriction between cephalothorax and abdomen, and by having but three pair of legs when young. The mites which produce galls or other deformations are mostly members of the genus *Phytoptus*, distinguished by the possession of only two pairs of legs. They are lowly organized mites, possess a very elongated and transversely striated body, and are all injurious to plants. Being extremely small, they have not been studied in the United States to any extent, in fact, most of them have not even received a name. Until 1851, they were considered as the larvæ of other mites, but now we know that they are adults. The two pairs of five-jointed, strongly compressed legs are close to the rostrum upon the extreme anterior portion of the body. The number of transverse striae varies in different species. Some have 30, others 55, and still others as many as 80 and more. Notwithstanding their small size, they move rapidly by means of their legs, dragging the long abdomen after them. A terminal disk assists them to cling to the surface upon which they move, and is also utilized to take hold of whatever it touches. As far as known, the mites hibernate in the buds and begin their attacks early in spring. They attack the unfolding leaves, and by inserting their rostrum in the under

side of the leaf cause the upper side to swell until gradually the gall is formed, which closes below (Fig. 6, *b*). Here the mites live and multiply.

When we consider how well protected these mites are by the vegetable structure enclosing them, we can realize at once that neither arsenical poisons nor emulsions are of much use against them after the galls have been formed. Carefully plucking the infested leaves and burning them is the only feasible remedy in spring and summer. By spraying plum trees that are invaded by them during the fall, winter and spring or before the mites have left their winter quarters, we may be able to reduce their numbers. At all events, eternal vigilance is the price of a fair crop of unblemished plums.

ENTOMOLOGY.

J. S. HARRIS, LA CRESCENT.

In our part of the state the summer of 1893 was what insect collectors would call a bad one, owing to a partial failure of the "bug" crop. The primary winter was exceptionally severe; the spring and early summer wet and cold, followed by a long protracted drouth and, as a consequence, a great many kinds of insect, injurious or otherwise, have been unusually scarce; yet it has been marked by the presence of a few species in exceptional numbers.

The winter was one of the most disastrous on record for the honey bee in our part of the state, and the greater portion of these, probably nine-tenths, perished in their winter quarters or before spring had hardly opened. Most other insects of the bee family must also have suffered severely, for, with the exception of the bumblebee, they have not seemed nearly as plentiful as usual. The small insects of the fly kind, that usually appear in great numbers in early spring and in pleasant days swarm about our blooming fruit trees, were noticeable for their absence, and perhaps to this and the fact that our neighbors had no bees to lend, may be attributed in a large measure the shortage of the fruit crop, through lack of proper polenization—although some people think that don't help much. The oldest inhabitant cannot remember the year before when the mosquitoes have been so scarce.

The common house flies did not appear in greatly annoying numbers until the summer was well past. The tent caterpillar, that but a few years since was so conspicuous in orchards and fruit gardens, has almost entirely disappeared; we saw but one nest of them during the entire summer. About the codling moth and apple gouger we cannot tell for certain, for in neglected orchards there were few or no apples, and the consequent famine would have been hard on them. Some insects took advantage of our first visit to the World's Fair to put in their work upon the oak trees about our place without giving us any opportunity to detect or identify him. As it was at the right season, we suspect it may have been the June bug.

The foliage on many trees was so badly injured as to stop the

growth and give the trees a sickly appearance, and they did not recover their greenness during the season.

A species of the grasshopper, or locust, became very numerous in some localities toward fall, doing considerable injury to the pastures and injuring nursery and orchard trees to some extent by devouring the foliage and eating the immature bark. I expect a method we practiced one season in Ohio would have been a good remedy in the nursery; that was to drive them out two or three times a day with a long rope and a boy at each end sweeping it along the tops. A drove of turkeys will soon clear a nursery of them. In my young orchard I drive them out of the trees and then wash the trunks and main branches with lime whitewash, in which is dissolved a pound of copperas and a little carbolic acid to each bucketful. As the most of them climb the trees the remedy seemed to help considerably toward keeping them off.

Toward fall the European cabbage worms were more numerous than they had been for several years previous. We account for this from the severity of last winter. While no amount of cold will destroy the chrysalides of this insect, they have a natural enemy in the ichneumon flies, that some seasons keep them well under subjection; but in some of our most severe winters this little parasite has its numbers greatly reduced. Wasps also and some other insect that were scarce during the season, prey upon the larvae and afford considerable protection.

Early in the month of June an insect known to entomologists as the false chinch bug (*Nystus Augustatus* (Uhler)) made its appearance in great numbers and committed serious depredations upon the strawberry plantations in the southeastern part of the state and in La Crosse county, Wisconsin. The attack was made at a critical period, just after the young fruit had set and needed the full energies of the plant for developing it. This little insect is a true bug, and like others of its kind, feeds by suction and injures the plant by depriving the same of its juices and causing it to wilt. They are very general feeders and often injurious to young buds, radishes, turnips, etc., and we have seen them on grapes and raspberry plants; in fact, one season we attributed the loss of our raspberry crop to them. Last season their worst ravages were upon the strawberry plants. During the hot, dry days that occurred between June first and fifteenth, they could be found crowded upon the stems of the plants sucking the juices, causing the plants to wilt and the fruit to shrivel; and a great number of the plants finally died outright. Like the true chinch bug, dry weather is most favorable for their development, and in a wet season they are not generally numerous enough to do much damage. As with the true chinch bug, one of the best preventatives is clean cultivation. Prof. Keely, entomologist of the U. S. Department of Agriculture, says that it winters under all sorts of field rubbish, and the careful burning of old weeds and trash will undoubtedly lessen its numbers. He recommends the use of pyrethrum powders and kerosene emulsion as among the most practical remedies.

SOUTHERN MINNESOTA HORTICULTURAL SOCIETY.

ANNUAL REPORT, 1893, PREPARED BY CLARENCE WEDGE, SECRETARY.

In accordance with Article III, of the constitution of your society, I have the pleasure of furnishing herewith a list of the members of the Southern Minnesota Horticultural Society and a report of the proceedings of their first annual meeting.

At a preliminary meeting of a few horticulturists of Mower and Freeborn counties, held at Albert Lea in October last, F. W. Kimball, of Austin, was chosen president, and Clarence Wedge, secretary, and a committee on program appointed, which in due time announced the following program:

Program of the Winter Meeting of the Southern Minnesota Horticultural Society, to be held in the city of Austin, Wednesday and Thursday, December 13th and 14th, 1893:

OPENING SESSION, WEDNESDAY, 1:30 P. M.

Prayer, Rev. C. E. Wright; What are We Here For, Pres. F. W. Kimball; Can a Farmer Grow Strawberries, Geo. H. Prescott, Albert Lea, Manlius Asher, Austin; Lawns and Ornamental Trees, G. Seebach; Profit in a Minnesota Orchard, E. D. Ames, Lyle; My Four Best Russian Apples, J. B. Mitchell, Cresco, Ia.; appointment of committees by the president; Question Box.

WEDNESDAY EVENING SESSION, 7:30 P. M.

Address of Welcome, Mayor of Austin; Response to Address of Welcome, by a member of the society; The Raspberry Patch, J. S. Harris, La Crescent; Will Horticulture Pay in this Country, L. French; Some Hints on Flowers all Can Grow, A. N. Kinsman, Austin; The Influence of Horticulture on Our Homes, O. W. Shaw, Austin.

THURSDAY MORNING SESSION, 9:00 A. M.

How to Prune the Grape, illustrated, C. R. Ransom, Albert Lea; Plums, a Neglected Fruit, Clarence Wedge, Albert Lea; Evergreens for Shelter, A. V. Ellis, Austin; What Fruit can our Farmers Most Profitably Plant, E. H. S. Dartt, Supt. of Experimental Station, Owatonna; Report of committees; Question Box.

THURSDAY AFTERNOON SESSION, 1:00 P. M.

Election of officers; a discussion on vegetable gardening led by J. S. Harris, Geo. H. Prescott, and others; Remarks on General Horticulture, J. J. Hunt, Brownsdale; The Growing of Celery, N. I. Johnson, Austin.

Discussions will follow each paper read. Everybody is cordially invited to attend these meetings and take part in the discussions. Membership in the society which will entitle the holder to receive the cloth bound reports of the State Horticultural Society, a fine book of over 300 pages, \$1.00 per annum, payable to secretary.

FREE ENTERTAINMENT

has been provided for all members by the citizens of Austin. Come all and help make the gardens and orchards, the streets, parks and groves of this, our "Blue grass region," the richest and most beautiful of the state.

Day sessions in the auditor's office of court house. Evening sessions in the court room.

F. W. KIMBALL, President,

Austin, Minnesota.

CLARENCE WEDGE, Secretary,

Albert Lea, Minnesota.

The programme as above was carried out with the exception of papers by Manlius Asher, E. D. Ames, L. French, C. R. Ransom, J. J. Hunt, and N. I. Johnson, several of whom are known to have been detained by sickness. The papers read before the society and the discussions following were of a nature likely to be helpful to those

making a beginning in horticulture, and were listened to with marked attention by an average attendance of about fifty. The room in which the meetings were held was especially cozy and pleasant and contributed very much to the good cheer of the occasion. The only fruit shown was a plate of Hibernial and specimen apples of Anisim (18 m) and Regel (169).

Upon motion a committee on fruit list for Freeborn and Mower counties was appointed. The report of said committee after considerable discussion and some revision was adopted as follows:

FRUIT LIST.

Apples recommended for general planting:—Duchess, Hibernial.

Apples for general trial to be planted in limited quantities:—Borovinka, Charlamof, Christmas, Good Peasant, Patten's Greening, Wealthy, Anisette, Blushed Calville, Breskovka, Anisim, Longfield.

Crabs and hybrids for general planting:—Martha, Early Strawberry, Whitney, Briar's Sweet, Virginia, Tonka.

Crabs and hybrids for trial:—Greenwood, Pride of Minneapolis, Dartt.

Grapes for general planting:—Moore's Early, Early Victor, Worden, Brighton, Delaware.

Grapes for trial:—Moore's Diamond.

Plums for general planting:—Desota, Forest Garden, Weaver, Rollingstone.

Plums for trial:—Ocheeda, Gaylord, Cheney, Wolf, Rockford.

Raspberries for general planting:—*Red*; Turner, Marlborough, Cuthbert; *Black*; Ohio, Palmer, Nemaha, Schaffer.

Blackcaps for trial:—Older, Kansas.

Blackberries for general planting:—Ancient Briton, Snyder.

Strawberries for general planting:—*Pistillate*; Crescent, Warfield; *Staminate*: Michel's Early, Wilson, Bederwood.

Currants for general planting:—Red Dutch White Grape Victoria.

OFFICERS.

The following officers were elected for the ensuing year:

F. W. Kimball, Austin, President. Geo. H. Prescott, Albert Lea, Vice-President. Clarence Wedge, Albert Lea, Secretary and Treasurer. Executive Committee—E. B. Crane, G. Seebach, Austin.

The following were appointed a general fruit committee:—F. S. Haupt, C. L. Hill, James Jorgenson, Albert Lea. A. J. French, G. C. Hawkins, Austin. J. J. Hunt, Brownsdale.

The following delegates to the State Horticultural Society were appointed:—Clarence Wedge, Miss Gertrude Ellis and G. C. Hawkins.

LIST OF MEMBERS.

Honorary—J. B. Mitchell, Cresco, Iowa.

Annual—G. Seebach, Austin; O. W. Shaw, Austin; Aaron Kimball, Austin; A. N. Kinsman, Austin; A. J. French, Austin; James D. Smith, Austin; R. L. Johnson, Austin; R. Hobson, Austin; J. Boulton, Austin; Chas. Barnita, Austin; M. Teeter, Austin; G. C. Hawkins, Austin; G. R. Weseman, Austin; M. E. Varco, Austin; F. W. Kimball, Austin; Geo. H. Prescott, Albert Lea; Clarence Wedge, Albert Lea; F. S. Haupt, Albert Lea; James Jorgenson, Albert Lea; Philip Lem-

brick, Rose Creek; Even S. Evenson, Rose Creek; F. Boelk, Lansing; E. H. S. Dartt, Owatonna; James Taylor, Woodlawn; Arne Huseby, Adams; E. B. Crane, Austin; Lewis P. Peterson, Freeborn; Robert Freeman, Glenville; C. L. Hill, Albert Lea.

FROM THE SECRETARY'S NOTE BOOK.

A motion to put the Wealthy on the list for general planting brought on a lively discussion. It seemed to be the sentiment of a majority of the members that while it was too valuable to discard, it was too unreliable to be placed on a par with the Duchess and Hibernial.

The catalpa was reported hardy and satisfactory at points in Freeborn, Steele and Mower counties, in the latter county one tree on the premises of Mr. G. Seebach being now about fifteen feet high. The horse chestnut was also bearing fruit in Freeborn and Steele counties.

The red cedar was strongly endorsed as the very hardiest tree to plant for windbreak; but the point was made by Mr. Dratt, of Owatonna, that some trees, doubtless from southern seed, had proved tender. The white spruce received words of praise on all hands, and seemed to be generally regarded as far superior to the Norway spruce in most situations in our state.

The propagation of plums on their own roots was urged and several points made in favor of such propagation.

Letters of regret were read from C. G. Patten, of Charles City, Ia., and Edson Gaylord, of Nora Springs, Ia.

Final resolutions were passed thanking the citizens of Austin for their handsome entertainment; the county auditor for the use of his room; the visiting members, Messrs. J. S. Harris, E. H. S. Dratt and J. B. Mitchell, for their wise counsel; and the press of the city of Austin for their help in advertising the meeting.

It may not be improper to add to this report an expression of the pleasure and satisfaction the officers of the society have felt in their work, and an encouragement to form similar societies wherever possible in the state. Of the twenty-nine members, probably not more than eight would otherwise have received our state reports, and only perhaps half of the eight have had the benefit of an attendance at a horticultural meeting; not to mention the numbers who were interested listeners at the meetings, but who in these close times did not feel like sparing the dollar required for membership.

Since the meeting, the newspapers of Austin have published nearly all the papers read at the meeting, together with the fruit list recommended by the society. The papers of Albert Lea have also printed a goodly share. Thus the suggestions of our best fruit growers and tree planters were enjoyed by, probably, not less than two thousand additional readers.

The treasurer's books show that all this was brought about at an *expenditure of only \$13.30*, and that there is remaining a surplus of \$14.70 in the treasury. In the facts above mentioned, we think there is very substantial encouragement for the organization of similar societies, and we are confident that under the care and with

the help and encouragement of the state society, they might become a most important factor in developing the resources of our state and beautifying and ennobling its homes.

PRESIDENT'S ADDRESS.

ANNUAL MEETING SOUTHERN MINNESOTA HORTICULTURAL SOCIETY.

F. W. KIMBALL, Austin.

Friends and Patrons of Horticulture: "What are we here for?" Surely not for the reason implied by the question of the delegate from Texas. Were the test of fitness an entire lack of horticultural knowledge and experience, I might consider myself a first-class candidate for any position in your gift. I accepted this position as a seeming necessity, that I might in a small way help this society in its start, and I trust you will so regard it. Being a lover of all kinds of fruit, I have always taken an interest in horticulture, but have been so situated that it is only of late that it could find expression. It was, perhaps, only opportunity that was needed to make me an enthusiastic devotee of horticulture, and I am now in a small way trying to carry to a practical solution the dream of boyhood and the oft-time wish of after life.

When of late I commenced to read more fully the state horticultural reports and in a small way correspond with horticulturists, asking questions freely, I was surprised at what thorough and systematic work was being done in this line, and I became convinced that good could be accomplished in a small way by a county society. Then, without previous consultation, Mr. Wedge proposed this larger organization; and this, our first regular meeting, is the result of a few friends of horticulture getting together and perfecting an organization, the intent being to hold winter meetings alternately here and at Albert Lea, thus making it within the reach of all.

While I cannot teach you anything relating to horticulture, Mr. Wedge, our secretary, is amply able to do so, and he has succeeded in interesting many of his horticultural friends to be with us, among whom is Mr. J. S. Harris, the pioneer of horticulture in this state, and of whom it can be said no man in this great state stands higher or has given more ungrudgingly of his time and means to develop the great interest he has so near his heart. We expect much, also, of Mr. Dartt, of Owatonna, one of our pioneer nurserymen now conducting a state experimental station at Owatonna, who undoubtedly can tell us of many failures, and I hope of some successes—it is through our failures that we finally learn the way to success. We have with us also Mr. Mitchell, of Cresco, Iowa, a nurseryman and orchardist of long standing, who is highly honored in his own state and section, and of whom we are in hopes to learn many things; and who can tell us some valuable things learned in the disaster of 1873. We also hope for the presence of Mr. E. Gaylord, of Nora Springs, Iowa, who has given much thought and study to the subject and has given the world many valuable suggestions, and I am in hopes he can give us valuable aid.

It seems to me that almost a new epoch has opened in fruit growing in this section. We can start in avoiding most of the errors of

the past, and with the few hardy varieties now recognized, we can, if we choose, experiment a little with others and gradually grow up a list of iron-clads.

Now, let me suggest that as we gather here for information, that we get all we can out of it; and let no one be afraid to ask questions, for in this way can we more largely gain information. After a paper is read, all shall have a chance to ask questions, bringing out such information as is uncertain to them or freely criticise any ideas promulgated, to be themselves criticised by others; in this way much can be learned. We will also have a question box, which we wish freely patronized, thus bringing out information on any subject in which any one is interested and which may not be touched upon by the papers, or previous discussions. In this way we hope to awaken an interest through this entire section and bring it fully before the minds of the people that this need not be a section devoid of fruit; and while we cannot raise it as freely and in such an endless variety as in more favored localities, let us remember that what we can successfully raise can be brought to a much higher standard of excellence than in the milder climates.

What are we here for? I hope not from a purely selfish motive. We wish to awaken an interest that shall never die out, that shall so develop the fruit interest in this section that our children and our children's children shall bless the day this interest was awakened. The things to learn are: what varieties are hardy and the best means of propagating and caring for them; what nurseries are worthy of patronage, who will only recommend hardy varieties and send out stock true to name; and what ones to avoid. I am confident that there have been sold and delivered in this town within the year hundreds, and perhaps into the thousands, of dollars worth of trees that can bring their owners nothing but vexation and mortification and, perhaps, such disgust that they may never try again, to say nothing of the influence on the neighborhood. Every man with a small patch of ground can grow berries of various kinds enough for a large family, to say nothing of grapes and apples.

Then let us strive to make home the more pleasant with plenty of fruit and flowers, and vegetables, thus bringing health, happiness and peace in its train, alike blessing him who grows and him who eats.

"INFLUENCE OF HORTICULTURE UPON OUR HOMES."

O. W. SHAW, AUSTIN.

Read before the Southern Minnesota Horticultural Society, 1893.

There were two features of the rocky farm up among the New Hampshire hills, where I was born and spent my childhood, that are most prominent in my recollection. These were the orchards planted by my great-grandfather and the garden cultivated by four generations of the same family. These, indeed, were the ornaments of the homestead; but the former dominates and seems the more personal, and tonight I could, in my thought, go on and locate many a particular tree and recall its name, and smack over the flavor of its fruitage.

There was the "Harvey" apple in the lower orchard, being the particular property of my grandfather, reaching the maturity and full richness of its flavor about midwinter, and doled out to us boys only on some great occasion or as reward for extraordinary good conduct. Then there was the "Molly" tree behind the cider house, named for a maiden aunt of a previous generation, known to all the boys for miles around, and few of whose apples ever got into the cellar. There was the "Moulton" apple in the upper orchard and the "Long Stems" behind the barn and the "August Beauties" in the little field, but space forbids repetition.

The first settlers of that region must have delighted in the planting of apple trees, for they not only created orchards but continued the planting along the stone walls, by the road sides and the lanes leading to the pastures.

Oh! the beauty and fragrance of those trees in bloom! and what a spectacle at autumn gathering!

Mr. President, such memories are a pleasant heritage and one of such scenes may have lingered uppermost in Wordsworth's recollection when he penned the incomparable "Old Oaken Bucket." Notice that he mentions first the orchard:

"How dear to my heart are the scenes of my childhood,
When fond recollection presents them to view,
The orchard, the meadow, the deep tangled wildwood,
And every loved spot that mine infancy knew."

Apples are the favorites of mankind; every eye covets and every hand reaches to them, and we may as well remember that by this fruit Adam is supposed to have lost his moral standing.

But aside from the fruit, the trees themselves—what giants they were! And, Mr. President, what a glorious object the tree! How magnificent is a forest of them on plain or hillside! And the single tree, there is scarcely its match for beauty among unintelligent objects on the face of the earth. Solitary, or in the row or group, planted by human hands, or spared by them from ordinary extermination near the abode of man, how "expressive and admirable!"

Hitherto, with comparatively few exceptions where fortunate locators obtained timber claims, the exigency of creating natural windbreaks at the soonest possible time has led our people of this country to largely surround their dwellings and other farm buildings with rapid-growing soft trees. But that more ornamental and valuable trees will sooner or later be substituted, not only to surround our farm buildings but as well to shade our highways, is not an unreasonable expectation. And would it not be a part of the proper mission of this society to encourage and teach such substitution and use? Visionary, say you? Not more so I think than some of the schemes advocated in the good roads convention of recent memory.

Experiment begets success. I remember twenty or more years ago when there was a popular doubt as to whether evergreens could be successfully grown in this locality. That Mr. Ellis' were doing so well was said to be owing to either some peculiarity of soil quite uncommon hereabouts or method of cultivation which the public could not get on to. Today the term is applied to one of

the best appointed and most valuable farms in this state, and this present season a friend told me of his habit of riding out for a smell of Mr. Baudler's pines.

Our own city, we are proud to say, appears during a portion of the year as if embowered in trees, and examples demonstrate the possibilities attending the growing of the best and most valuable. We are beginning to realize the wisdom of planting hard maples, not for permanency only but for beauty as well. The common mistake is setting the trees too close together. It seems a sacrilegious proceeding to chop out every other one of a particular row, and I was much interested last spring in Mr. Coats' experiment of transplanting the large trees from his yard to the front of his lot. One lived, the other died. There is a fine row of these trees on the north and east sides of the block occupied by H. O. Basford and others. They were planted by William Cook more than thirty years ago.

As an ornament for a lawn, a birch now and then looks well. Contrast is one of the finest of all the laws of association, and when planted near an evergreen, the effect of this tree is very marked. There is no reason why we should not plant them, but I don't believe there are a dozen in town. I think there is one in Mr. Kimball's yard; others, I don't remember.

Some years ago, visiting Mr. Dartt's plantation at Owatonna I asked him to show me a beech, and he did. 'Twas a seedling, some eight inches high, but all the same it did me good to recognize the buds. I would like to inquire tonight how it is getting along.

Then there is the elm. I notice some are being planted about the city, and there is an especially fine row north of the lot where Mr. Birkett lives. These were set out by E. O. Wheeler, all of fifteen years ago. I am not sufficiently versed in arboriculture to say whether these are the same species that are so prevalent in New England or different, but they appear brothers. It your native Merrimac valley, Mr. President, what an object in the landscape this tree is! A very patriarch of the family of shade! The majestic, the umbrageous, the antlered elm! I remember one of these trees by the roadside opposite my father's house. I have seen larger, but none of more perfect symmetry and beauty. "One among a thousand," it stood of the multitude which the taste of its early proprietor had left dispersed on the broad landscape. How often, on my occasional visits to my mother, have I reached a certain elevated roadway some miles distant as the crow flies and stopped to catch a glimpse of that tree! It stood on the ground as though it "rose in dance," its full top bending over toward the ground on every side with the dignity of a forest king and the grace of a weeping willow. In my very boyhood, I could look upon it for hours. It was the handiwork and architecture of God, of which the eye of man might never tire, but gaze on with refreshing and delight.

But, Mr. President, I have got into a labyrinth and must recall myself, calling at the same time on every man to plant trees. 'Tis a virtue to set out trees; tis loving our neighbor as ourselves. Set out trees, not to make your home outshine your neighbor's, but for him as well as yourself to look upon and walk under. Plant trees; and whether for ornament or from which you may expect to gather

fruitful material returns, remember that beside beautifying God's earth the very act projects you into the future in issues that may be determined long after you are dead.

Are they but saplings? What undreamed of administrations and dynasties they may not outlive? Do you pluck from trees of your own planting apple or plum? Know that from the same branch other hands will pluck apple and plum when your body may have shrunk to a pinch of dust. In this thing you have wrought for posterity, and unborn people shall have cause to think kindly of you.

THE HORTICULTURAL EXHIBIT AT THE MINNEAPOLIS EXPOSITION, 1893.

R. S. MACKINTOSH, ST. ANTHONY PARK.

The fruit and flower exhibit at the exposition was arranged to be made during the second and third weeks of the exposition.

The rooms set apart for the exhibit were in the part of the building known as the art gallery, which were shelved and decorated for the occasion. One large room was used for the exhibit of grapes and apples. During the time that it was fixed up, it was a beautiful sight to look upon; the bright colors of the Duchess, Wealthy and other apples on one side, blending with the darker shades of grapes in the center and on the opposite side.

A small room, with rows of apples on either side, was entirely filled with Duchess and Wealthy.

The plums were on the side of a room, while in the corners was the display of decorative plants. The flowering plants and cut flowers were located in a large room adjoining.

Of our large apple growers, Mr. R. C. Keel, of Rochester, was the only one to make a large show. His display was very good, considering the season which he had to grow them in. Being the only large exhibitor, he received the award of most of the premiums. Mr. Williams, of Barnum, showed several new seedlings, some of which are quite promising. The Jewell Nursery Co., of Lake City, had a fine lot of seedlings. On the whole, the display was a credit to the exposition and to the growers, even if it did cost a large sum. Many visitors could hardly imagine that we could produce such fine fruit in our state.

The grape display was very fine. As usual the Lake Minnetoka grapes took the lion's share of the premiums, and they were well earned. Mr. H. L. Crane's display occupied a table in the center of the room, while on two sides were located the displays of Mr. A. W. Latham and Mrs. Barton, of Excelsior, and Mrs. Underwood, of Lake City. Mr. A. W. Latham's collection received the first premium, and his single plates many others.

Mr. A. H. Brackett was the judge of the grapes, and below I give a table of his weights of the plates receiving the first premiums and also the weights of the largest bunches. I also include therewith the weights of the largest bunches of grapes receiving first premiums at the state fair, 1894.

Weight of Grapes at Minneapolis Exposition, 1893, and State Fair, 1894:

	Minneapolis Exposition. Largest single bunch, oz.	Plate of five bunches, lbs. oz.	State Fair. Largest single bunch, oz.
Agawam.....	9½	3—1	8½
Barry.....	7½	2—3	8½
Brighton.....	14½	3—7½	15½
Concord.....	13	3—10	19
Delaware.....	6½	1—15	10
Duchess.....	11	3—7	14
Early Victor.....	....	—13½	5½
Empire State.....	4	1—6	8
Herbert.....	10	2—12	8
Iona.....	17	4—1½	15½
Janesville.....	5	1—8	6½
Lady.....	5½	1—7	7
Lindley.....	14	3—6	9
Massasoit.....	8½	2—6	9
Moore's Early.....	11½	2—15	8½
Poughkeepsie Red.....	6	1—7½	....
Pocklington.....	9½	2—8½	10½
Wilder.....	7	2—2½	7
Worden.....	14½	3—13½	9
Telegraph.....	....	....	6
Niagara.....	....	....	11½
Cottage.....	....	....	6
Wyoming Red.....	....	....	4½
Aminia.....	....	....	5
Martha.....	....	....	3
Eldorado.....	....	....	6

FLORAL DISPLAY.

The display of decorative and flowering plants of the first week was very fine. When the electric lights were burning the sight was very beautiful. Many people remarked how beautifully they were arranged. Those competing for the premiums were Messrs. Mendenhall, of Minneapolis; Windmiller & Son, of Mankato, showing tuberous begonias, and Mr. August S. Swanson of St. Paul.

The displays of cut flowers were on the table during the second week. There were three changes during the week: First, came the cut flowers tastefully arranged; second, table decorations; third, original designs.

The table decorations were very good. Mr. August Swanson arranged a round table and Nagel & Co. an oblong table.

The original design feature was not so well competed for. Mr. August Swanson took us to a valley in the mountains, showing the wild flowers, running water, trees and moss everywhere.

In general the show was very good, and those that brought their plants and flowers deserve much credit for their trouble.

Forestry.

TREES FOR THE FARM AND HOME.

Extract from an address by Col. John H. Stevens, president of the Minnesota State Agricultural Society and president of the State Forestry Association, delivered at the Farmers Institute, Montevideo, 1888:

We should plant trees:

First—for the ornamentation of the farm. I feel confident that I am addressing myself to an intelligent and appreciative class of men, who will be willing to admit this idea for its true value to them on their farms. You know that your farms are worth more for your efforts at improving and beautifying them, not only for market but also for your own personal use. You know that they will sell readier, and that they will bring you more money when sold for the beautiful trees that are planted upon them. You yourself would not take much money to have those trees removed that your own hands have planted and you have watched with care. In all our sterner thoughts of life, we cannot afford to altogether ignore the beautiful in nature and the beautiful in art. To you "A thing of beauty is a joy forever" as well as to the rest of humanity, who are even now panting for the beautiful. Again, "Life without beauty is a dead and unwholesome thing," and "Trees are fit to minister to man's manly sense of beauty." These are the modern expressions of the deep and hidden sense of the beautiful lying under our sterner natures, and which are so successfully ministered to by the grand and majestic beauty of the living plant or tree. The man who could pitch the dwelling designed for the abode and resting place of his family in a dreary and open field, treeless and flowerless, is a long way behind the aesthetics of the age, if he is content to leave it so; he has spent the foregoing part of his life for nothing, and has yet everything to learn respecting the beauty of this life. We know that men are alive to their best interests, and that they must and will plant trees around their farms and their homes for beauty and for use. Everywhere we see encouraging examples of movement in this direction, and much may they be extended.

THE HOMES OF THE BIRDS.

Second—Trees are the homes and meeting places of the birds. Every farmer in our vast country will at once see and recognize the force of this proposition. Birds are the children of the air, and lodge among the branches of our trees. If there are no trees with their wealth of beautiful branches on our place, we can have no birds. If there are no birds, there is no restraint upon the millions of devouring insects that are ever ready to prey upon the crops that the honest farmer needs for his bread and his money. So the relation between the tree planting and the farmer's pocket is established and is intimately close—closer, indeed, than some of us are aware of. Let us remember that most of the small and beautiful birds that warble among the branches of our trees are insect-eating birds, and are our most intimate and devoted friends, ever working for our in-

terests. Let us encourage them and their friendly efforts for our good in every possible way by planting trees for their convenience. The tree and the bird! How astonishingly beautiful these organized objects of kind nature are in their life and their work! Each of them are grand conceptions of Infinite wisdom, and are worthy of our attention and careful study that would fill volumes of scientific and useful teaching. The tree and the bird! How intimately close is the relationship that exists between the departments of the natural world, between the vegetable and the animal kingdom, between the merest vegetable and the highly organized beauty of the air! This relationship is easily traced, the one ministering to the daily requirements of the other. Would we have birds to cheer and to bless us, let us plant liberally the trees they love.

FARM ECONOMY.

Third—The economics of the farm require trees planted. I am sure there is no farmer but will readily appreciate this statement and will immediately pluck up his ears at the mention of it. By the economics of the farm, however, I do not intend the discussion of the most advantageous ways of feeding stock or the best breeds of horses, cattle, sheep, etc., to keep for profit, but, rather, what are we going to do with those waste lands on our farms that are too wet and mucky to be used for the culture of grain, or that are too rough to admit the plough? These are questions of much importance to us, because every acre of our farms is liable for taxation, consequently, we, of all men, can ill afford to allow any of it to lie idle. We want it all to bring in something, and something that is useful to us. We advise you to plant the low mucky places with the American larch or with black ash, or with elm or willow; and, besides turning a dismal swamp into a field of beauty, it will soon be a source of great profit to its owner. The useless land of this country should be planted as early as possible, though in ever so rough a way, with young seedlings of oak, maple, or even a small quantity of the cottonwood, box elder, elm, white walnut or butternut. It would soon astonish the most incredulous to see the quantity and suddenness of the growth and profits arising from these discarded eyesores of the farm. Allow no stagnant miasma holes or useless eyesores on your place to destroy the symmetry and beauty of your lovely farms. Plant them with trees, so shall they be to you objects of pride and satisfaction and blessings to your country.

HEALTH.

Fourth—The healthfulness of the farm. At first sight you may perhaps think that now you have me. We say in all candor plant them on the farm and town lot for healthfulness. It is well known that trees in their growing action absorb large quantities of gases from the earth and from the air. These gases for the most part are effete animal exhalations that have served a purpose, but are now given off from our bodies as useless, and worse than useless to us. These gases are the very life of the trees, and are absorbed by them in large quantities. Again, the trees give off gases that are useless to them, and these gases are the very food of our

life. Only think of an arrangement like this in the infinitely wise economies of nature! The vegetable and the animal—the one mutually dependent upon the other, the lower form living for the higher, and neither of them living for itself. We have thought that a small but wild plantation of trees as a coppice on the lower end of each town and village lot would be the best advice that could be given by our boards of health. How much effete and decaying vegetable matter is recklessly thrown out in the back yards of all our town lots and left to decay and poison the atmosphere we are hourly breathing for our life! Its deadly influences are sometimes felt by us and the dear ones of our family circle, when attacked with the varied forms of acute inflammations or with typhoid fever, or the more dreadful diphtheria.

A coppice of wild trees, interlaced with vines and creepers, just at the lower end of the lot, would be a calm retreat from the scorching heat, and a reservoir to utilize all the poisons and pestilences of the atmosphere. How simple the remedy, and yet we are paying the debt of our negligence of the species of nature. Blocks of trees on the farm would answer precisely the same purposes, and be an everlasting fund of satisfaction and pure enjoyment. Farmers, let us plant trees for healthfulness for ourselves and for our families; for what are all the wealth of our coffers of gold compared with the unspeakable blessings of health?

MODIFICATION OF TEMPERATURE.

Fifth—It is very generally admitted that trees have the power of absorbing and storing up latent heat, and again giving it out in times of extreme cold. If this is so, and we fully believe it is, how fine is the modifying influences that may be exerted on our climate in its depressing moods? Again, it is believed that the tree has the power of absorption of moisture, and in a time of severe drought again giving it out liberally through its trunk and its branches and leaves in the summer time. This influence ascribed to the tree has the effect of cooling and moistening our dry atmosphere during the heated term. This view presents the tree as an enormous laboratory, utilizing heat and dispensing coolness and moisture to correct the extremes of our seasons. By the simple means of their agency the extremes of temperature endured in every treeless region may be corrected. But, further, we have sometimes thought, while sitting under our spreading trees in the intense heat of summer, that there was always a cooling breeze there, and, consequently, that they were attractive to coolness and breeze. Have you not many times been struck with the same idea?

If we had the space at our command, we would like much to enlarge here on the subject of windbreaks and storm-stayers, etc., in relation to trees. We are more than certain that the agency of trees is the most efficient and effectual wind-breaker that can be adopted. We are almost as certain that the same gentle influences may be credited with the cooling and refreshing moisture of many a summer shower that visits our plantations. When shall we arrive at a correct understanding of the great laws of nature, and the governing

forces of the world? When shall we learn the proper relationship of one part to another in the arrangements of nature? How can we have the blessings of a fertile and fruitful country without the agency of trees?

DISTRIBUTION OF ELECTRICITY.

Sixth—The distribution of electric fluids in the air. The subject of electricity is a mysterious question that we cannot fully understand. Yet we know that the vast treeless plains of our continent are frequently visited with those destructive influences and the deadly lightning bolt. Every limb and twig and leaf is a silent conductor of electricity. The great prairies of the West are annually visited by these alarming displays of nature to their serious loss and the discomfiture of the people. In tree-growing regions these displays are less frequent and less severe. Our advice, therefore, is to plan trees around your dwellings, to ward off the influence of destructive lightning.

SHADE.

Seventh—Trees furnish a friendly shade and cooling breezes for the farmer's children and his cattle. As we have already anticipated this item to some extent, we will here simply say that for this use alone trees will pay far more than they cost. Is it nothing to you that your children have not the cooling shade of the spreading elm tree or the more emblematic maple, under whose spreading branches to enjoy their healthful sports at midday in the height of our heated season? Is it nothing to you that your cattle of pure blood, your horses of noble ancestry, and your sheep of finest clip, are left out standing in the melting heat in a friendly fence corner, and without the grateful shade of one spreading branch over their defenceless heads? Oh, I know you count your interests better than this, and though you would not for your children, yet for your horses, cattle and sheep you will provide the grateful shade that blesses them in the burning noonday. Plant trees!

TIMBER.

Eighth—Trees supply timber, poles, and brush for the use of the farm. Oh, you say, this is a glaring statement. It will take years upon years after I am old to grow timber, etc., for the uses of the farm from these trees, and we will never see any benefit from the trees we plant! We know from our own experience that trees planted on good soil and doing well for ten years will come into considerable usefulness, especially for poles and brush for the farm. In passing through the southern part of this county last fall with Hon. Mr. Shannon, of Granite Falls, we were amazed at the size and beauty of their fine trees planted on the roadside and in the field. These trees, mostly our cottonwood, maple, elm, box elder, and sugar maples, could not have been planted many years, and yet they were large, fine-spreading, handsome trees, and an ornament to any country. Be not, therefore, so easily discouraged. Kind nature is generous of any assistance given her, and what can be done in this county can also be done in any county in the state. Plant trees,

therefore, as nature can do nothing for the man who will not help himself. If you will help her she will award you with the proudest and most satisfactory results to crown your feeble efforts. Try it!

PRECIPITATION OF RAIN.

Ninth—Trees are an encouragement to rainfall and water supply. This has now become a settled principle in the creed of understanding tree planters, and our observation teaches us that it is correct.

Trees by means of their influence on the atmosphere increase the amount of condensation of moisture and precipitation. Again, by means of their roots and their action on the soil, they check the force and injury of torrents, and by rendering the ground porous and open, largely drink it in, to be given out again when and where most needed. But, again, forests, by means of their abundant foliage, evaporate or throw off enormous quantities of moisture into the air, and this, after being carried about by the winds, is condensed by the coolness of evening, and falls plentifully upon the neighboring country in the form of pearly dew. So the action of the trees and the relation of the atmosphere is constantly going on, and every time man receives blessings by the mysterious arrangement. Plant trees for moisture!

GENERAL BENEFITS.

Tenth, and lastly. By planting trees for ornamentation and shade, we shall have more fruit and better fruit, better crops of grain and grass, better horses and cattle and more pleasure and purer enjoyments in life. We need trees around our orchards to give out warming and tempering influences in the springtime when the trees are covered with tender blossoms and the air is loaded with pinching cold. We need the presence of trees around our fields and our homes in summer to condense the cooling vapors and to invite the pleasant zephyrs to fan our parched brows. More especially, we need the presence of trees in our winters to offer a calm resistance to the raging blast and to shelter the tender buds of our fruit trees from the withering cold and killing frost. We need their grateful presence around the home, of our loved ones, for their presence is cheering to our eyesight, and it is a relief to look upon them while nothing but whiteness is all around.

Let us each in our humble way strive to add our humble mite to the sum total of our engagements of this humble life below by planting a few trees to live and testify of us after our heads are laid low and our hands are still in everlasting rest.

NORTHEASTERN IOWA HORTICULTURAL SOCIETY— ANNUAL MEETING, 1894.

CLARENCE WEDGE, ALBERT LEA, DELEGATE.

The annual winter meeting of the Northeastern Iowa Horticultural Society convened at Mason City, Ia., Nov. 27, 1894.

The attendance could scarcely be called large, but the papers and discussions were of a high order of excellence. The opera house was pleasantly decorated with flowers and a large display of fruit added inspiration to the occasion. The apples were below the usual size shown at this meeting and especially wanting in color. A barrel of Duchess, kept in cold storage, were displayed on the table, and seemed to look nearly as well as when put into the barrel at picking time.

Your delegate was made an honorary member of the society and accorded more than all the courtesies usually extended to such visitors.

Although the season was not a profitable one for horticulturists generally we did not hear a word of discouragement, but all seemed confident that we would be able to adapt our methods to any variations of climate that might come.

Reports from the directors being first in order, J. C. Ferris, of Hampton, reports some disappointment with the new things on trial, especially with the fruitfulness of the new Russian apples. C. F. Gardner, of Osage, reports Rockford, Wyant, Wolf, Hawkeye, Desota and Miner the best plums, and the *Picea pungens* the most beautiful of evergreens—it has been during the past nine years perfectly hardy. He reports great injury from the white grub on evergreens from small seedlings up to trees six feet high. Mr. Mitchell, of Cresco, reports the Crescent the leading reliable strawberry, and Warfield has not stood the dry weather so well; also, that Schaffer is the most reliable of the red raspberries, and Ohio and Souhegan of the black. A number of members endorse the Agawam, No. 15, as a good and profitable grape that has been somewhat neglected. Roger's Hybrids should be commingled in the vineyard with other varieties and should be grown on the cane renewal system, allowing no canes to remain longer than three years. Nearly all reports agree that small fruits were not more than ten to twenty per cent. of a full crop the past season.

L. S. Johnson, of Clear Lake, in a paper on "Strawberries," recommends planting on ground prepared in a wonderfully careful manner. He plows the land very deeply in July; sows to a crop of buckwheat, which he plows under when in blossom; and then puts seventy-five loads of old manure per acre, which remains till spring. As soon as ground can be worked he uses a pulverizer very thoroughly; then plows under very deep; then pulverizes again and planks before setting plants. Mr. Johnson has four or five acres in berries, and thinks there is no method of succeeding without great care and labor. He keeps all runners cut until the middle of July, allows matted rows eighteen inches wide, raises two crops and then plows under. He frequently has the best crop in the second year;

finds Warfield, Bederwood, Michels Early, Bubach, Crescent and Glendale the best kinds, in the order named. He thinks \$115 per acre clear profit what we may reasonably hope to receive. He uses marsh hay as a winter cover for new beds, and coarse manure for old beds; puts the Crescent among the last on the list. He ships most of his fruit and finds it too soft for distant markets. Mr. Johnson's paper and his work at his place were very generally commended.

J. M. Elder, of Concord, in a paper on "Mistakes in Horticulture," says that from the mistakes of the experimental planter we have received about all of value we now possess, and accords to them all honor. He thinks that not over ten per cent. of tree fruits, other than plums, that have been planted in northern Iowa, have come to profitable fruit bearing; largely due to the fact that buyers, instead of accepting what they may plant with safety, have reached out for new and untried kinds. He advises all to plant from home nurseries instead of patronizing traveling mountebanks. "Novelties and frauds are synonymous terms."

Prof. Hanson, in his subject "Horticulture in the Public Schools," said that we are fifty years behind the times in this matter. Germany is in the front rank. As horticulture is an essential matter in home making it is a subject that all should study. In almost every school yard in Germany there is a nursery. In this they are by their teachers taught how to sow seed, how to plant trees and how to graft. Early impressions being the most lasting, this has a moulding influence on the German people that is everywhere noticeable. Teachers are trained for this work in the schools of horticulture. One of the best of these he visited was in Silesia. In these about half the time is given to lectures and half to exercises in the field and nursery. The expense of the teachers' attendance at these schools is met by the government. Upon the return of the teachers who have visited these schools they are expected to recite what they have learned in local teachers' institutes.

W. A. Burnap in his annual address gave away an important secret. His success in fruit raising, he said, was entirely due to the fact that in his library there is a complete file of the reports of the horticultural society for many years.

Secretary Elmer Reeves, of Waverly, in his report recommended that the report of the Northeast Society be printed separately from the State Society report, and a large number distributed free to applicants. He states that tree planting is surely on the increase, and that a greater number of home grown trees are being used than heretofore.

Blight of the apple being under discussion, Pres. Burnap thinks that blight is very contagious, and that he would as soon introduce a case of small pox into his house as he would a known blighter into his orchard.

C. G. Patten reports more blight than before in all the years of his experience. The Shields crab is not inclined to blight even among blighting kinds, and one of our best and hardiest trees to use as a stock for topworking.

A resolution being introduced: That "blight is contagious and planters are recommended to plant with certain varieties that are known to have such tendency." Prof. Hansen states that experiments have shown that healthy trees can be inoculated by using a knife on them that had been used on diseased trees. After an interesting discussion the resolution was adopted.

C. G. Patten, of Charles City, recommends that the younger men go on and develop a race of apples that shall be, with other good qualities, free from blight. C. F. Gardner in a paper on "The Gooseberry and Currant" recommends propagating the gooseberry by using hard wood cuttings eight inches long, set in August and covered during the winter with a heavy mulch. English gooseberries may be propagated by top-layering. Varieties recommended are Houghton and Downing. The English varieties will only succeed in a few favored locations. Varieties of currants recommended: Victoria, White Grape, White and Red Dutch, and Long Bunch Holland. Prof. Hansen says that the Houghton gooseberry is very popular for wine making in Europe. He found also common in the nurseries there both the currant and gooseberry grafted three feet high on the common yellow-flowering currant, the belief being that the fruit is larger than when on its own roots.

Mr. Ivins, of Cedar Falls, thinks the Marlborough hardier than the Turner and one that furnishes a long season of picking. The Lancashire Lad is the best of the English gooseberries and the freest from mildew of any of that class. Mr. Mitchell finds the Marlborough hardy in sandy soil, but a poor fruiter. Mr. Elder recommends the application of flower of sulphur as remedy for mildew on gooseberries; he has had great success with it.

The Royal Church raspberry is spoken of by Mr. Ferris and Mr. Patten as a good bearer, but a very imperfect fruit. Mr. Johnson always has orders ahead for canning purposes for all the Schaffer he can grow.

Nelson Hanson read a paper both humorous and rich in helpful suggestions on planting the grape for home use. Thinks that although grapes may be bought cheap they are generally *cheap grapes*, and the boys and girls may like to see something on the farm besides corn and hogs; that many have failed in their attempt to raise grapes because they have tried to raise too many pigs, chickens, calves and colts in the same enclosure with their grapes; it is not safe to put manure in the soil near the roots of the vines—he has tried this to his complete disgust.

At the election of officers all the old ones were re-elected.

In his paper on "The Orchard" by S. W. Ferris, he expressed a preference for clay, rather than a sandy soil. Selection of tree is very important. He prefers trees three to four feet high with heads two to three feet from the ground. Set three to four inches deeper than they stood in the nursery; he favors close planting. Duchess, Wealthy, Longfield and Hibernial are good in his locality. Plant on north side of hill, or place an evergreen on south side of each tree and keep sheared to three to four feet high. A wash of lye half strong enough to make soap will kill insects.

D. J. Purdy, the great apple buyer of Mason City, Iowa, thinks that orchards are not half cared for. It is a mistake to plant poor trees, and a greater to fail to attend to their care.

Upon the question of recommending certain varieties, four had tested the McMahan and one recommended it, if planted on dry land; three had tried Mackintosh Red, and not one recommended it; ten had tried Longfield and eight recommended it—Prof. Hansen especially commended its early bearing.

Prof. Budd in his paper on the future of native plums expressed the belief that by crossing the native and foreign varieties we would

procure a larger and finer plum than the Japan. Mr. Patten thinks the Russian plums worthless for his section.

Edson Gaylord in a paper on "Tree Protection" emphasized the need of protection for the orchard from the sun rather than from cold winds; would allow the trees to branch well on the south side that they may be self-protecting; mulch the orchard heavily and cultivate four inches deep between the rows two or three times each season.

The next meeting of the society will be at Hampton.

PLEASANT WORDS FOR THE MINNESOTA STATE AGRICULTURAL SCHOOL.

Mr. J. S. Harris and myself had the pleasure of spending a day at the State Agricultural School the twenty-second instant. This is a visit that has been thought of often, but as often postponed, but now that it is accomplished the only regret is that so keen a pleasure had not been enjoyed before. The sight of 175 earnest young men gathered in the chapel is one long to be remembered.

This school has grown remarkably, having an average increase of about thirty per cent. per annum. I do not know the exact number, but remember only two or three years since its being spoken of as having an attendance of forty or fifty. The buildings and accommodations on the place for the various branches of study pursued include the workshops for blacksmithing and carpentering, the drill hall, the barns devoted to cattle husbandry and veterinary surgery, the dairy, the greenhouses, the two or three large buildings devoted to general classroom and dormitory purposes, the chemistry building and others, which make an equipment that to an amateur seems very complete. With the number of students in attendance, however, it is apparent that everything is crowded to its utmost capacity. Indeed, when two well grown boys sit on a seat designed for one person, as was the case a score of times in the chapel, it is apparent that something must be done at once to increase the accommodations, or else to discourage the attendance. The farmers' boys are evidently bound to come, and the girls are wanting a chance, too, and ought not to be shut out. We saw plans, preliminary sketches, for a new central building designed to meet the more immediate wants of the school. By all means the present legislature should look after the educational wants of the farmers' sons.

Horticulture is, of course, well represented in this school, both in the experimental fields and in the classroom. Prof. S. B. Green has a very pleasant classroom, seating about sixty-five, and it was our privilege to see it full; and Mr. Harris had an excellent opportunity there to talk some straight horticulture to the boys, which they evidently appreciated.

Dear friends of the State Horticultural Society, visit this school; it will do you good. You will come away, I am sure, from a day spent there some years younger, and the reflex influence of your presence and the few words you may say for our cause will have an excellent effect on the work in Minnesota in which we are so much interested.

A. W. LATHAM, Secretary.

Obituary.

IN MEMORIAM.

In reviewing the events of the year we should most gratefully recognize that Divine goodness which has preserved to us so many of the old veterans of horticulture, the pioneer fruit growers, nurserymen and gardeners of the Northwest to a ripe old age. Within the year three men, whose names have become household words in all this region, have been called to the other side to receive their rewards for well spent lives. They have all contributed largely in developing the horticulture of this state and Wisconsin. They were all life members of this society.

EPHRAIM WILCOX.

Ephraim Wilcox was born in Saratoga Co., New York, June 11, 1812, and died in the town of Shelby, La Crosse Co., Wisconsin, Nov. 17, 1894, aged 82 years, 5 months and 6 days.

In 1833, he was married in Oneida Co., New York, to Miss Mercy Adams, an amiable and fitting helpmate, and enjoyed the happy union fifty-nine years, she having departed this life in the spring of 1892. The fruit of the union was eleven children, seven of whom—five sons and two daughters—survive to mourn his departure. In 1842, he came with his family to the territory of Wisconsin and settled in what is now Kenosha county. In 1862, he removed to Trempeleau Co., Wis., where he engaged in the orcharding, nursery and small fruit business. In 1878, he removed to La Crosse Co., Wis., where he founded the Mount Hope Nurseries, planted an extensive orchard and vineyard, and made his home until his death.

He was a man of sterling integrity and untiring perseverance, and only those who knew him well are aware of the time, money and persistent effort he has expended to make fruit growing, under great difficulties, a success. In early life, he became an uncompromising abolitionist, and during the war of the rebellion was active in the sanitary commission, and three of his sons were in the union army. He was a man that never lost faith in the final triumph of right. After the slaves were freed he was an earnest worker in the temperance reform and was perhaps the oldest prohibitionist in the state of Wisconsin. He was a member of our state horticultural society and for distinguished service in horticulture was several years since made a honorary life member.

JAMES M. SMITH.

James M. Smith of Green Bay, Wis., died early in the summer of 1894. He was also an ardent promoter of Northwestern horticulture and made a grand success of market, vegetable and small fruit growing, and was for many years president of the Wisconsin Horticultural Society.

GEORGE P. PEFFER.

George P. Pfeffer died at Pewaukee, Wis., in the autumn of 1894. His footprints are seen in hundreds of homes in eastern Wisconsin, that are surrounded with stately deciduous and evergreen trees and beautiful shrubbery; and his new creations in fruit, produced by crossing and hybridizing, have placed the "gates ajar" for great possibilities in the near future of apple culture.

The hoary locks of the three have been consigned to the tomb. The world is better for their having lived in it, and the friends of horticulture in Wisconsin and Minnesota will clasp hands in brotherly kindness over their last resting places.

J. S. HARRIS.

IMPORTANT!!

REDUCED RATES TO ANNUAL MEETING.—The press announces the dissolution of the Western Passenger Association, but it is not likely this will interfere with reduced rates on the railroads to our annual meeting. It will, however, be necessary in order to secure this reduction that one hundred certificates be presented at the sametime to the railroad agent at the place of meeting. **DO NOT FAIL** then, by all means, to secure a certificate from the railroad agent at the place of starting out and at *all transfer points* stating that you have purchased a full fare ticket to the meeting of this society. If all in attendance do this, there will be no trouble about getting back at one-third rate.

It is not yet decided definitely where the meeting will be held, but will be announced in the January number in connection with the program.

SECRETARY.

Your Corner.

PIONEER TREES.—Jacob Klein, of Houston county, Minn., had a seedling apple tree that has yielded him more profit than any one acre of ground on his farm occupied by the usual farm crops. The seed from which the tree was raised was brought from Ontario, Canada, in 1854, and planted in the spring of 1855. The tree was planted out in orchard in 1857, with some 50 or more of others, and is now the only survivor with one single exception. The tree bore a few specimens in 1860, and has not failed to produce some fruit every year since; previous to 1872 it was an annual and regular bearer. In 1885 it bore but a few specimens, and since then has born, very heavy crops on alternate years, and the other years light crops. On two years over 30 bushels a year have been gathered from it, and on every bearing year, it produces from 20 to 25 bushels. Mr. Klein estimates that he has gathered altogether 175 bushels of first-class apples, and that the fruit produced has been worth \$150. The girth of the tree two feet above the ground is 50 inches; length of trunk to first branch is four feet; height of tree about 24 feet; spread of top 33 feet. The tree leans a little towards the northeast, but has never received any injury from sun scald, and with the exception of the Adelaide of same age is the only tree in the orchard that was not somewhat injured either in the winter of 1872-3 or 1884-5. The fruit is full medium in size and as perfect in form as if every specimen had been made to order. The quality is very good when in season, usually October, but loses flavor after the season is past.

J. S. HARRIS.

PEACHES AT HOUSTON CO. FAIR.—One of the greatest attractions of the fair was a liberal show of home grown peaches, some of them still clinging to the branches to show that they were real and not raised in baskets. They were freshly picked from the trees and were raised at Spring Grove by G. F. Flatin. The variety is a seedling, of which he has six six-year-old trees that this year produced about twenty-five one-third bushel basketfuls. The sizes of some of the specimens were as follows: diameter 2 $\frac{3}{8}$ inches; length from stem to point three inches; weight of single fruit seven ounces. The color is a whitish yellow, mostly covered with deep blush on the sun side. It is a freestone with small pit, thick meat and of delicious flavor. We are informed that the variety reproduces itself true from the seed.

J. S. HARRIS.

RED WING, Oct. 11, 1894.—"Our crops have been fair and the outlook for next season is bright now. As usual I burnt over my old strawberry field the 19th of July, in the dry time, and they are looking fine—with everyone saying 'You have done it now.' The field is now worth looking it."

WM. DANFORTH.

Secretary's Corner.

Wm. Somerville, of Viola, has been appointed delegate to the winter meeting of the Iowa State Horticultural Society to be held at Des Moines, Ia., Dec. 11, 1894.

SOUTH DAKOTA HORTICULTURAL SOCIETY.—This society meets in annual session at Vermillion, S. D., Dec. 11-13, 1894. Alfred Terry of Slayton has been appointed a delegate to represent our society on that occasion.

PROGRAM FOR OUR ANNUAL MEETING.—Look for the program for this meeting, which will be found in the next, January, number. It will not be sent out to members in a separate enclosure as has been done heretofore.

The 24th session of the American Pomological Society will be held at San Francisco, Cal., Jan. 16, 17 and 18, 1895. The next volume of transactions will be more than usually valuable and interesting. Minnesota ought to have more memberships in the society. Biennial membership, \$4.00. Life membership, \$20.00. J. S. Harris is vice-president for Minnesota.

Mr. Clarence Wedge, of Albert Lea, has been appointed delegate from this society to the annual meeting of the Northeastern Iowa Hort. Society, meeting at Mason City, Ia., Nov. 27-29, 1894. His report as delegate appears elsewhere in this number.

Question Box.

(In replying to a question, give its number.)

6. Is Herbert any more reliable than Rogers Nos. 4, 9 and 15?
7. Do you know of any Russian apple, except Repka Malenka that can be classed as a winter apple?

G. J. KELLOGG, Janesville, Wis.

8. Who knows anything about the "Minnetonka" apple, being sold by the agents of L. L. May & Co., at \$1.50 each—not more than a dozen to each person? It is advertised as "very large," an "ideal cooking apple" and "keeps about two months longer the Wealthy." I would like to know more of this high-priced variety before buying.

THE MINNESOTA HORTICULTURIST.

VOL. 22

JANUARY, 1895.

NO. 12.

VALEDICTORY.

DEAR FRIENDS.—With this number closes the first year of “The Minnesota Horticulturist.” It was an experiment undertaken with some reluctance—this subdivided method of sending out our reports—and it has been possible to carry out the plan only through the co-operation of various public officers and co-workers in this society, which has been always willingly given.

Has the “new departure” been a success? From the secretary’s standpoint it has, decidedly. The magazine has evidently entered a field ready and waiting, and if properly encouraged and supported by the society and the state, as there is every prospect it will be, it is safe to predict that at no distant day it will occupy a position of high importance, as it does now a unique one.

The fact that a large amount of accumulated material, some not so new, had to be worked into this year’s numbers in order to get it on the records, has affected injuriously the purpose of making the magazine “timely.” But this all cleared off now, and hereafter the field is open for fresh matter as it comes in.

New and advanced methods are being considered, and in the natural course of development, we shall surely make progress in the year 1895. Yours fraternally,

A. W. LATHAM, SECY.

207 Kasota Block, Minneapolis, Minn.

N. B.—The twelve numbers of this year will be bound together with the journal of the last annual meeting of our society, the index and some other papers of value, making a cloth bound volume of some 550 pages, which will be sent postpaid to every subscriber, new or old, upon receipt of the annual fee of \$1.00 for 1895—with the understanding that you distribute among your acquaintances the magazines received during the past year.

Following the established plan of the society, the “Horticulturist” for 1895 will be sent only to those who renew their membership and subscription.

Remittances should be made to the secretary.

WIND.

E. H. S. DARTT, OWATONNA.

Every since the breath of life was breathed into man and he became a living soul, wind, or air in motion, has been to him a prime necessity, without which he cannot exist. Wind is life, the absence of it is death. If we shut wind from a congregation of people, we sow the seeds of death by instituting lung starvation with resultant diseases. If we shut wind out of the orchard in summer time, we cause lung starvation there; for trees in leaf are said to breathe, and when they have absorbed all the life-giving elements within their reach, they sicken, and sometimes die, of blight, sun-scald and mildew, diseases which might have been averted by a free circulation of air. If we shut out wind in winter, we shut off a source of actual heat. Obstructed wind creates friction, and friction creates heat. The orchard can no more thrive without wind than the saloon can thrive without boys.

I have not had time to figure out just how rapidly the mercury will rise in an orchard subjected to a wind of thirty miles per hour; but I have always noticed that the heat of discussion always keeps pace with the amount of wind let loose. We always have a windy time at our meetings, and sometimes the heat of discussion is enough to warm up a whole neighborhood. We all have windmills here, and the wind is tempered by the kind of mill it passes through. Elliot's mill is probably the best mill we have. It is perfect in construction, is kept well oiled, runs still and is always ready for quiet, forcible business. It enables him to have his own way without making any fuss about it. Now, if we see anything moving smoothly along in the horticultural line without any apparent guiding hand, like the fishpole cars, we may safely calculate that Elliot is not far off nodding consent. We would all like the Elliot mill; it would save us lots of trouble; but if we all had it, it would become too common and too monotonous, and we might sigh for the clatter of more noisy structures; for, truly, variety is the spice of life.

Latham and Underwood have mills of the Elliot pattern. Latham is studying on attachments, and Underwood has decided to attach a crank to his as an evidence of his political faith—I advise all of you to hitch on a crank. Smith's mill is an all around mill; that is, it is adapted to all kinds of work. Its power is unquestioned, and it is always ready. If it ever run down, I have not heard of it. It is a handy mill to have around, for if we get becalmed, we can just untie Smith's machine, and we are all right.

The Brand mill nears perfection in all its parts. It is automatic, will blow cold or blow hot, run fast or run slow, as occasion requires. It is amusing to see the apple list go through this mill. Starting in on Russians, it will scarcely move and emit a cool breeze; as it comes to seedlings, it quickens and warms up, and when it comes to Peerless it goes off with a clatter and runs like lightning.

The Harris mill is an all around mill like Smith's, and a little more so. Power not sufficient for size of the mill. We have sometimes thought Harris long-winded. That is because his mill is so large

that he cannot get up speed. If he could trade a great lot of his attachments to Smith for wind, both mills would be improved; the Smith mill would run steadier, and the Harris mill would run easier and faster and do better work. Concentration makes great men; expansion spoils them. No man, however great, can spread himself all over creation without becoming too thin somewhere. An ordinary breath makes no perceptible impression. That same breath concentrated creates a whistle, and a little more concentration produces a yell. We would not have men whistle and yell all the time but we would have them concentrate their thoughts and their wind to a sufficient extent, if possible, to give reason and force to their utterances, especially when those utterances are thrust upon the public.

The professor's mill is a combination of the oiliness of the Elliot, the adaptability of the Brand and the power of the Smith. Some of the professors have much solid work to perform. These can get along with the Elliot brand combine. With others, wind is their principal stock in trade, and they must depend on the Smith end of the machine. There is an old saying, "much smoke, little fire," this transformed for the professors would read, "little work, much wind." It does not require much talent to make statement of well known facts, but when it is necessary to make something from nothing, or nearly so, and fix the thing up and clothe it for respectable society, there is room for a lively imagination and a great amount of diversified talent. Whichever part of the mill the professor ties to, he should add a few hobbies of his own and then pull himself together and blow—yes, blow for all he is worth. The average professor that cannot blow a good, sensible, strong blast is not worth a continental.

I hope my personal allusions have been kindly received. If not, I will say that I am here and believe it is a sneak of a man who is not willing to face the music and receive his just deserts. I expect to do that here and hereafter. There is one other application of wind to which I will allude. Men frequently fail in great financial enterprises because they cannot raise the wind. All persons thus troubled should attend the winter meetings of the Minnesota State Horticultural Society, and they will find as much wind to the square inch as in any other spot on the globe.

EVERGREENS.

ERIK ANDERSON, LAKE PARK.

Ornamental trees suffered from last winter (1893-4) as much as apples. I have thirty varieties of evergreens and something over a hundred varieties of deciduous trees, raised mostly from seed, and many from seed I got from sixty degrees north latitude, in Sweden. Nearly all have been sick this summer, and Scotch pines and Norway spruces that had grown to be from twelve to sixteen feet high froze clear down; and those not killed have not grown over four or five inches this summer; but all the native trees have stood the winter very well. The white pine has grown fully two feet this summer, but I think the hardest and best of the pine family for this part of the country is the gray pine (*Pinus Banksiana*).

You can possibly draw some conclusions as to this winter-killing from this fact, that the fall of 1892 froze up very dry.

Ornithology.

BIRD STUDY.

MRS. LOUISE SAMSON, MINNEAPOLIS.

"The world is too much with us, late and soon,
Getting and spending, we lay waste our powers,
Little we see in Nature that is ours.
We have given our hearts away, a sordid boon."

So Wordsworth says, and how true it is.

When we look around on this beautiful and bountiful earth, where the term of this human life is to be spent, we wonder that that life should so often be so devoid of joy. It would seem that mankind in general are blind, voluntarily blind, to much that might cheer and help. Surely a love for nature, cherished and cultivated through all one's life, is one of the surest means of rising above this groveling way of living to which the majority seem prone. It keeps us simple in our tastes, healthy in body and mind and lets us grow old in a much sweeter and more natural way.

A love for and an interest in the natural things around us should form part of our love to God; we should value them for the wonderful things in their structure and workings, which show how great He is who made them. This is true with regard to all parts of nature's kingdom, but it seems especially so with regard to the birds. They are exceedingly interesting to us. The advantage which their power of flight gives them, the attractiveness of their songs, the beauty of their plumage, deservedly place them high up in the order of natural life. Even man exclaims, "Oh! had I the wings of a bird!"

How much would the naturalist give to have the eyes, and advantages of locomotion of a bird! These migratory visitants go over such large portions of our broad land, and could tell him where all the rare flowers and insects for which he so assiduously hunts, could be found. They witness the most varied and beautiful scenes for the painter's brush; they know from afar the dreaded cyclone's approach; in fact, they are the "traveled" portion of the animal creation. Because they are made to be thus untrammelled and free in their motions, it seems so cruel to cage them. Far better to cultivate a friendly acquaintance with them in their own free, natural way of living and gain their confidence by protecting and helping them all we can. Man has taken such a different course with them, that it will need uncounted seasons of good treatment to overcome their timidity with us.

The farmer should, above all others, seek this friendly alliance, for he so much needs their help. Had he no birds on his grounds to destroy his insect enemies, it seems to me he would find their swarming armies too much for him. Why should he begrudge robin or waxwing the few strawberries or currants they feast on?

It was their own activity in gathering food for their spring broods which, perhaps, made the fine berry crop possible. Let him be industrious and ingenious enough to bag his grapes and screen his strawberries, thoughtfully and justly leaving out enough to pay robin for *his* work.

"'Tis love that makes the world go round," not selfishness. Selfishness clogs the wheels, and blinds us often to our real, true interests, and makes us have a much harder time.

A thoughtful interest given to that other world of life which goes on in the tree-tops will tide us over many a weary hour. Sometimes one is favored with a nearer personal acquaintance with individuals. Shall I ever forget the delightful experience I once had with a ruby-throated humming bird in a Virginia flower garden? These true children of the tropics are very sensitive to cold, and I found my little beauty, one cold morning in September, perched on a twig of petunias, benumbed with the frosty air. I took him carefully in my hand and carried him into the house, where he soon became lively. I tried to feed him with a drop of melted sugar. He soon grew quite fond of the dainty, two drops at a time being sufficient to satisfy him. This he would take from the end of my little finger, running the long wiry black tongue around and beneath the nail, as if it were a flower. In four hours he would fly to me and light upon a little twig which I held out to him, to get his treat; then away again to the top of a picture frame or, sometimes, the back of a chair. Whenever he alighted, it was always accompanied by a little cry much like the squeak of a mouse. I have since heard this from wild humming birds. One day we gave him some liquid honey in a small dish. He tumbled in from the edge through the zeal of the small person who was trying to feed him, and was in a deplorable pickle, for the tiny wings were so clogged he could not fly, and the fine soft feathers on his breast were a mass of stickiness. I soaked the little wings in tepid water, and released them, but how to cleanse the little green and gold body! Finally, I took the eye end of a large sewing needle, and dipping it frequently in the warm water tried to comb out the feathers. He was perched on a twig held in my left hand, free to fly if he chose, but there he staid and let me work with him, only moving along a trifle on his perch and squeaking a little, as much as to say, "Yes, get it off, only please be gentle."

I have never happened to see a wild humming bird bathe, but this little bird much enjoyed splashing the water over himself from the bowl of a silver spoon held in my hand. At night he went to bed by four o'clock perched on a twig in the window, which I trimmed with flowering branches for him—a little green and gold and ruby gem, with tiny head hidden under tiny wings. The little perfect bird form seemed far more exquisite in proportions when quietly perched than when hovering or flying.

How little we really know about these birds! Did one ever see a flock in migration? And how can they endure the long flight? I do not mean from Virginia, but we have the same kind in Minnesota. Dr. Hatch says it is the only kind found here.

My bird was with me but a few days. One evening at twilight

when we thought him securely asleep on his perch, some one opened for a small space the outer door of his room, which led into an old-fashioned Virginia flower garden filled with shrubbery. Then there was a sudden whirr of the little wings, and he had left us. I never saw him again. That night there came a chilly rain, after days of drouth. I could scarcely sleep as I heard it, for it seemed to me there was a baby out in the rain.

Our Minnesota people are not backward in appreciating the beautiful summers of their dear state, and the birds evidently enjoy them, too. How full and glorious a list we have of not only temporary visitants, but the many who raise their broods here—and what Southern state could boast more richly-hued plumage, except in the humming bird family.

After the dainty spring warblers comes that imperial red tanager, doubly gifted in dress and song, with his inspiring lilt, "Be cheery, be cheery, be *very* merry." For weeks of one hard and trying summer, that cheery cry acted like a bugle call on the flagging spirits. And the orioles, both Baltimore and the orchard, how they fill the tree-tops around with social and melodious calls! For three summers the orioles hung their nest over our kitchen door, until the heavy snow of last spring broke down the convenient branch.

But equal to any of our feathered pets is the cat bird. Perhaps, his greatest charm is his versatility; he is forever preparing one surprises. His song is so varied that often you would think it another bird. One day last spring, while the leaves were scarcely unfolded upon the trees, a young city friend went with us boating along the shore of upper Minnetonka. Suddenly from a thick cedar tree, growing close to the water's edge, there came the softest, most melodious warble, almost under the bird's breath, as it were, and continued for at least ten minutes, while we sat and listened.

"There is the cat bird," I said. "What," exclaimed our friend, "*That* a cat bird! I thought they only gave a harsh, disagreeable cry like a cat, while this is the softest, sweetest melody imaginable. I shall never forget it."

Later in the summer, while visiting the World's Fair, two of us staid for several weeks at that vast and peculiar female caravansary, the "Woman's Dormitory." The very first morning I was awakened by an extremely varied, loud and brilliant bird song. I thought I could distinguish so many notes of different birds among them, unmistakably the whippwill. I said, "what a fine *mocking bird* some one living near here must possess!" And next day we looked to see if, perchance, his cage hung in sight. But on a morning soon after, the same song came from a tree-top under our very walls, and, behold, it was a cat bird! And so day after day, both morning and evening, the cat bird gave us his beautiful song for the rest of our stay. Such a varied and gifted singer of his family, I never heard elsewhere. We said, perhaps the birds, too, had heard of the wonderful fair, and he had been chosen as delegate for his tuneful powers.

The blackbird is another interesting bird, capable of forming strong attachments and of fine imitative powers. If trained while

young, he may be taught to whistle any simple air. The Germans, who have much patience in these things, say, "you must take him from other birds when about six weeks old, and let a tune on a flute or some other wind instrument be played over to him, morning and evening. Feed him before commencing operations, and place some bribe or other, perhaps a lively worm, in his sight but not in reach. Play the tune with precisely the same time and expression for at least twenty times, then give him a little quiet so that he may, if he will, have opportunity of imitating it. If he should make any attempt, instantly give him his reward, coaxing and praising him meantime. Being a bird of strong reasoning powers, he will soon discover why the worm or other bribe is given him, and will before long understand how to earn it. When once learned, the tune of tunes seems never to be forgotten, but passes, as it were, into his song.

ORNITHOLOGY.

F. I. HARRIS, LA CRESCENT.

I regret that circumstances over which I had no control have prevented me from taking usual notes and observations on movements and habits of our native birds, during the past few years, and, therefore, it is not likely that I can offer anything new on the subject.

Ornithology, or the study of birds, is, with the exception of entomology, the most important of all the natural sciences to the horticulturist, and while it is pre-eminently the most interesting and fascinating of studies, both to the amateur and professional crank, yet the ignorance of the mass of mankind in regard to even our most common birds is surprising. Judging from my own career, it would help solve the problem of "How to keep the boys on the farm," if the study of natural history was more generally encouraged.

Of about three hundred species of birds inhabiting our state, either as residents or migratory visitants, comparative few are injurious to the husbandman, and the great majority are either decidedly beneficial or, at least, harmless. In case of a number of water-fowl, for instance, which would seem to be of least benefit, they are good to eat.

It has been lately established by our government authorities, in the examination of the stomachs of hundreds of specimens, that our birds of prey are, for the most part, beneficial in the destruction of vast quantities of vermin and insects, which constitute their main food supply during the greater portion of the year; and only a few of the larger species ever molest the poultry yard. So far as my own observation goes I would say, that in our state the destructive species of this order are confined to the red-tailed and Cooper's hawk and the barred and great horned owl; and after climbing to a nest of the last named species, containing young birds just hatching—and by way of ornament, five half grown rats—I have forgiven the birds, even after being disappointed in getting a set of eggs to add to my collection. There are, however, a few species which are destructive to vegetation without any redeeming qualities, and in this last,

which we might call the black list in point of color, anyhow, I will place the entire family of blackbirds, which are so destructive to the cornfield; and will include the cow bird, which, though mainly an insect-eating species, is very destructive to the increase of other more beneficial birds—referring to the parasitic habit this chap has of replenishing his numbers by depositing his, or rather her, eggs in other birds' nests.

The common crow would also look well on this list, and deserves it, wherever numerous enough to do serious damage. I will also include the blue jay in this company, as he can hold his own with any of the others in a cornfield, and is, besides, a persistent robber of birds' nests.

Passing over the families of thrushes, orioles and other fruit-eating birds—which it is claimed, but not yet fully proven, consume enough insects to more than repay their indulgence—I wish to call your attention to a species equally destructive to the fruit grower and without any redeeming qualities. The bird referred to is the yellow-bellied woodpecker or sap-sucker (*Sphyrapicus varius*), and should not be confounded with either the hairy woodpecker (*D. villosus*) or the downy woodpecker (*D. pubescens*), both of which it somewhat resembles to the casual observer. These last named species are residents and both highly beneficial, being largely insect-eaters.

The true sap-sucker is a migratory species, arriving from the south usually about the first week in April and remaining three or four weeks, when the majority pass on to more northern breeding grounds, returning again late in September or early in October and again regaling themselves before departing to more southern climes to spend the winter. His manner of operating is to select the healthiest and most thrifty tree and puncture a semicircle of small holes, usually in several tiers, and feast on the inner bark and exuding sap, returning to the same tree or trees several times during the day. This may seem a small offence, but I can produce specimens of many trees which have yielded to the treatment and finally have died from no other cause. Many writers claim that the bird does this to attract the insects upon which it feeds, but I have made personal and repeated examination of the stomachs of a large number of specimens killed in the act, and always found them filled with sap and bark, but never yet detected a trace of insect remains. It usually begins on evergreen trees, but later, when the sap has started, attacks maple and other shade trees, and also apple and other fruit and nut-bearing trees. The bird is very unsuspicious and may be easily approached, but likes to keep on the opposite side of the tree from the intruder in the manner of other woodpeckers; but remain quiet a few minutes and he will peek around, when I recommend the shotgun remedy.

I had intended referring to the rose-breasted grosbeak and several other species which are decidedly beneficial, but as I have doubtless wearied you ere this, will defer this dose for another time.

Pantry Stores.

PANTRY STORES.

MRS. ANNIE BONNIWELL, HUTCHINSON.

You have called upon me for a report on "Cooking and Pantry Stores," and the thought strikes me that that has a wide scope; perhaps "hard times" will call for less scope than usual. But when it comes to cooking, to cook a small dinner, I can do that, or, if a large dinner is called for, give me the material and, in the language of the darkey, "I am *wid* you *dar*." A poor cook can spoil even a good potato in cooking it, while a good cook can make a pretty good dish with quite poor potatoes. While there are as many different opinions in cooking as there are cooks, and almost every lord of creation will say, "*My mother* was the best cook I ever kn^{ew}," show me the woman that will not arise and say, "I can cook just as well as she could," and I will show you a woman that does not have ambition enough to care whether potatoes are done, half done, boiled or fried.

And speaking of fried potatoes, or almost any other fried food, if I had a family that I wanted to kill off, I would give them something *fried* two or three times a day, and I think I would soon accomplish what I had undertaken. But if good wholesome food is what you want, in the first place, give me good wholesome flour, white and graham, with plenty of oatmeal for breakfast, white and graham baked in light bread, with just as little warm bread as possible; good meat well cooked (which I will give my receipt for later), vegetables and fruits, well cooked, and seasoned meals regular three times a day, with plenty of good milk and golden butter—not *oleomargarine*—and you may have all the rest.

"But," says you, "you have not mentioned pie nor cake, what are you going to do with them?" I will pass them over to you; for it is my opinion that they were never meant for human beings to put into their mouths—they belong to our grandmothers' pantry and stores; and if there is any one that has never tried fruit in their place for dessert let them try it for the next six months, and see if they will not *dessert* the pies and cakes forever after.

RECIPES.

Baked Meats or Fowls.—Have a regular meat pan with cover (which can be had at any hardware store). Wash your meats well, with a clean cloth wipe dry, place in your pan, season well with salt, pepper and sage, if desired. Put on a little boiling water, and place in a hot oven, baste every half hour, doing it as quickly as possible to exclude air, and roast to a rich brown, but avoid over-doing it and not dry or blacken.

TOMATO MARMALADE.

Five quarts tomatoes, six quarts apples; stew separately, mix well, put in a kettle and add six pounds of sugar, two tablespoonfuls of ground cloves and three tablespoonfuls ground cinnamon; cook to consistency of apple-butter, or until it will drop from spoon without running.

COOKIES.

Two eggs, two cups sugar, one cup butter, one-half cup sour milk and one teaspoonful of soda. Mix soft and bake in a hot oven.

CAULIFLOWER PICKLE.

For one good-sized head, take two pounds white sugar, one quart cider vinegar, one teaspoonful cinnamon, cloves and allspice (tied in a cloth). Cook to a syrup. Steam the cauliflower until tender or until a broom-straw will pass through it readily, turn syrup on while hot, let stand until second day, drain syrup off, scald again, turn over and put away in jars for use.

SWEET TOMATO PICKLES.

Seven pounds sliced tomatoes, three pounds brown sugar, one quart cider vinegar, one tablespoonful each of ground cinnamon, cloves and allspice (tied in a cloth); cook the sugar, vinegar and spices to a syrup; slice the tomatoes, cook in weak salt water until tender, drain well, then place in the syrup and cook five minutes and put away in jars for use.

PANTRY STORES.

MRS. E. CROSS, SAUK RAPIDS.

To get the best satisfaction out of the different varieties of fruit, it is my aim to have them canned so that they will, when opened, during the long winter months, be as near as possible like they were at the time of canning. One thing I don't often see mentioned in the different reports is pieplant, which, according to the testimony of some of the best physicians in England, contains more good medicinal qualities than lots of the fruits that we talk so much about and is a great deal cheaper. The way that I put it up it is as good as when fresh pulled out of the garden.

Pieplant. Peel and cut into small pieces, pour boiling water over it, let it stand one-half hour; then drain and put in bottles and fill up with hot water and seal up.

Strawberries. To one quart of berries use one pint of sugar. Let them come to a boil and put in jars and seal up tight.

Currants put up in the same way, I find very nice

Raspberries. I use one cup of sugar to one quart of fruit. I prefer the old fashioned stone jars, as they are making glass jars so thin they are liable to break and spoil lots of fruit.

Sweet Tomato Pickles. Slice and put in salt brine twelve hours and then drain. Put your vinegar in a kettle and let it come to a

boil. Put the tomatoes in long enough to change color and then take out and put in jars. Then take fresh vinegar and to one quart add one pound of sugar, horseradish and seasoning to the taste; let it boil and then pour over tomatoes.

Pickled Red Cabbage. Slice up the same way as for kroust. Put in the jar as you slice it and sprinkle a little salt every three or four inches. Let it stand twenty-four hours, then drain and put in jars and put on hot vinegar with unground pepper, cloves and horseradish to suit the taste. Then it is ready for winter use.

QUESTION BOX.

"Will Prof. Green tell us how to exterminate the leaf roller on the strawberry?"

Prof. Green: Use a spray with Paris green or Bordeaux mixture.

"Has any one fruited the Princess strawberry in the vicinity of Minneapolis? If so, with what result?"

Prof. Green: It has not done very well with us.

Mr. Elliot: Well, I have, but only in a limited way. I planted a few Princess three years ago and fruited them year before last. I got one plant from Mr. Kramer, and did not take any more than ordinary care of it; and in the fall, I took from that one plant about fifty plants. I transplanted them in the fall, and they fruited last year; and some of the plants had fifteen to sixteen berries on them, and I liked them so much that I put out several beds. But last year was a very unfavorable year, and we did not get any fruit, so I do not think I gave it a fair test. In looking over the different bulletins and reports of nurserymen, they all give it a good recommendation. This year I shall be better able to report, because we have it out at Minnetonka where we can give it better cultivation, and I will give you a report next year.

"If there is any one who can tell us about ditching, we would like to hear from him."

Mr. J. A. Sampson: I will say that I am a great hand to drain. You often get the very best results from draining a low piece of ground. An open ditch is a very good form for drainage, but unless you can work close around it, I would prefer to have tile drainage.

Mr. Dartt: If that drainage means wind drainage, I know something about it. (Laughter.)

Mr. A. H. Brackett: I have a large windmill and tank. My idea was to take the highest point of my land and make a large basin there and during dry spells make use of my tank and basin. My highest point I could irrigate from my windmill tank and the balance from the basin. It is a clay subsoil, so I think the water might remain in the basin. I think in that way a good many might irrigate. It would certainly be cheaper than a tank.

"When should plum pits be planted, and must they be frozen?"

Prof. Green: As to the planting of dry pits, it may be done; but I should crack the stones and allow them to freeze and plant them in the spring.

Mr. Dartt: Do you think freezing is necessary?

Prof. Green: I think it is necessary to crack the pits.

SOUTHERN MINNESOTA HORTICULTURAL SOCIETY— ANNUAL MEETING, DEC. 4-5, 1894.

CLARENCE WEDGE, SECRETARY.

The following program was prepared for the meeting and carried out with the one exception of the paper on cherries.

PROGRAM.

OPENING SESSION, TUESDAY—10:00 a. m.

Prayer by Rev. G. A. Cooke.
Raspberries for the Home and Market—Mrs. Geo. H. Prescott.
My Experience with Strawberries—C. L. Hill.
Appointment of Committees by the President.

TUESDAY AFTERNOON SESSION—1:30 p. m.

President's Address—Pres. F. W. Kimball.
Facts and Figures from my Orchard—H. E. Nielson.
Thirty Years among Minnesota Orchards—Geo. H. Prescott.
Some Practical Methods of Grafting, illustrated—Clarence Wedge.
The Apple—E. B. Crane, Austin.
Peaches in Minnesota—G. D. Barron.
Question Box.

TUESDAY EVENING SESSION—7:30 p. m.

Music—Male Quartette.
Address of Welcome—Hon. T. V. Knattvold, Mayor of Albert Lea.
Response—O. W. Shaw, Austin.
Music—Violin Solo.
What I Know about Farming—C. S. Edwards.
Tree Culture Applied to our Lawns and Avenues—D. G. Parker.
Discussion.
Music—Male Quartette.
Hardy Shrubs and Flowers—James Jorgensen.

WEDNESDAY MORNING SESSION—9:00 a. m.

Report of committees.
How to Prune the Grape, illustrated—C. R. Ransom.
What one Grape Vine can do—Geo. Gardner.
How we Grow Cherries—G. E. Norton.
Question Box.
Secretary's Report.
Election of Officers.

WEDNESDAY AFTERNOON SESSION—1:30 p. m.

Suggestions on Planting Evergreens—E. H. S. Dartt, Supt. of Owatonna Experiment Station.
Budded Trees and the Men who Sell Them—Dewain Cook, Supt. of Windom Experiment Station.
Discussion on Vegetable Gardening—Led by J. C. Frost, C. L. Hill and others.

TUESDAY MORNING SESSION.

In the absence of Pres. Kimball, the society was called to order by the vice-president, Geo. H. Prescott, who continued to preside during the entire meeting.

Mrs. Geo. H. Prescott in her paper on raspberries recommended the Doolittle blackcap and the Philadelphia red as best for farmers to plant. A new planting of the blacks should be made as often as once in three or four years. For market would set the Gregg of the blacks and the Turner and Cuthbert of the reds. It is a good plan to begin to cover the Gregg quite early, about October 15, while the stalks may be easily bent.

C. L. Hill had succeeded best with Crescent and Warfield strawberries, was not certain of the value of Michels Early, had discarded Jessie and Wilson; soil sandy. After setting the plants, uses a riding cultivator, and later a Planet, Jr. Says that if we will inquire about the country of those who failed in raising berries, we will find that nearly all have bought their plants of distant and unknown parties strongly recommends placing something on the runners as they come out to hold them in place and assist them to take root. As a winter mulch, finds coarse marsh hay about the best; straw is too easily blown off, and wet, heavy material likely to smother the plants. If selling on the market, use new, clean boxes well and honestly filled.

In discussion following these papers: J. C. Frost has found strawberry raising for past twenty years a checkered experience; uses mulch a foot deep for his raspberries, has had good success in raising a mixed crop of raspberries and strawberries, the former in rows a rod apart and two or three rows of the latter between them.

At the close of this session an amendment to the constitution of the society was prepared and carried, reducing the membership fee from \$1.00 to 50 cents.

TUESDAY AFTERNOON SESSION.

PRESIDENT'S ADDRESS.

The president's address was full of encouragement and hope for those who will plant wisely and care for diligently. He believes in letting the experiment stations do the experimenting and in the average planter confining his choice of varieties to those that are well and favorably known. Expressed his own intention to set largely of the Hibernian and top-work it with the choice and less hardy sorts.

H. E. Nelson, who has pursued a careful system of bookkeeping in connection with his farm, transferred the following table from his book to his valuable paper on "Facts and Figures from my Orchard":

"The area of my orchard is two acres, with clay subsoil, sloping to the southwest, located west of a grove and protected with one row of willows on the south and west side. Have about ninety trees. The first year I had apples to spare was in 1880. We had some apples on our trees before, but they were so welcome to us that they were soon gone and I kept no account of them. Following is a report of my apple crops:"

1880.	Apples sold from 12 trees, 20 bushels.	\$16.30
1881.	" " " 12 " 22 " "	22.00
1882.	" " " 8 " 10 " "	10.00
1883.	" " " 17 " 25 " "	18.10
1885.	" " " 17 " 26½ " "	19.20
1886.	" " " 17 " 15½ " "	15.15
1888.	" " " 34 " 47 " "	39.45
1889.	" " " 10 " 8 " "	8.20
1890.	" " " 49 " 58 " "	33.30
1891.	" " " 8 " 9 " "	8.55
1892.	" " " 30 " 35 " "	26.45
1894.	" " " 30 " 70 " "	50.30

	244	346	\$269.00
Apples used by ourselves			150.00

Fifteen years \$419.00

In 1884, 1887 and 1893 no apples.

This is an average income of \$27.93 per acre for the fifteen years, including the three years when the trees failed to bear. On those two acres of ground, I have raised other crops besides, as follows:

Berries, annually, about 150 quarts.	\$12.00
Garden truck and potatoes	22.00
Apples	27.93

Total per acre per annum \$61.93

These figures are correct and reliable."

Mr. Nelson has noticed that a farmer who plants no orchard, intending to buy his apples, buys pecks instead of barrels, and his family are fed on pies and pastry instead of the luscious and healthful fruit. His mistakes have been made in setting on too wet land, and of too tender varieties; has succeeded in raising many trees from layers, but discovers no advantage in such trees. S. Richardson recommended deep planting for the apple, which was heartily endorsed by the secretary.

Mr. Prescott, in his paper, observed that our apple trees are standing many months with their roots in dry, frozen ground, and their tops at the same time in dry, freezing air, very harsh conditions for shallow-rooted trees. Has observed that the wild apple has a deep tap root, and thinks it is a provision of nature for a supply of moisture. Thinks we might imitate nature in this matter to our advantage, growing the orchard trees from the seed where the tree was to stand, and grafting at the surface of the ground. S. D. Richardson in digging a cellar where 3-year nursery trees had stood, found that their roots had already penetrated to a depth of four to six feet and over; thinks that any tree will send its roots to any necessary depth.

Mr. Crane in his paper on "The Apple," praised its merits as a fruit and expressed his opinion that as our seasons are growing dryer, we should be careful to plant our trees on the heavier and more retentive soils. Mr. Gaylord would encourage the formation of a head well branched toward the south; has observed that in old orchards the "survival of the fittest" have been among trees so branched. E. D. Ames, the most successful orchardist in Mower county, gave much of his valuable experience in his two-acre orchard, which in 1892 brought him \$450 worth of fruit. He dumps the manure from his stables rather indiscriminately among the trees and allows the hens to spread it. Is a believer in low heads and little pruning. C. R. Ransom would not allow the ground to be ridged up about the trees; had once bought an old barren orchard in that condition, and by reversing the condition and applying manure liberally, had brought it to a state of great fruitfulness.

G. D. Barren had raised peaches for several years by the method of of setting the tree on a saddle of earth and turning it down and covering each year, partly with earth and finishing with hay; finds that two men will cover about two dozen trees in a day. Mr. J. Smith has found great difficulty in saving the fruit buds on his covered peach trees. Has tried the Tong Pa and finds it no better in this respect.

The credentials of C. F. Gardner as delegate from the Northeastern Iowa Society were read, and by vote of the society he was made an honorary member. Mr. Gardner thought that we should take greater pains to study the anatomy and physiology of plant life.

TUESDAY EVENING SESSION.

The evening session was one of great value to those interested in ornamental planting. Mr. Parker recommended for avenue and lawn planting the elm, hard maple and linden; would plant fewer trees and use greater care in moving and setting; if setting in gravelly soil, would move several wagon loads for each tree and prepare a bed of clay for the roots of the tree to rest on, and fill in with good

loamy soil; avenue trees should stand not less than thirty feet apart; difficult to secure a vigorous growth without a mulch of some kind.

Mr. Jurgenson would not plant roses in a very prominent position, as they are so unsightly with their winter cover. Some of the trees and shrubs highly recommended in the discussion following were the red pine, white spruce, balsam fir, if properly grown from northern seed; also the hackberry and white fringe.

WEDNESDAY MORNING SESSION.

The session was opened by a carefully illustrated and instructive talk on how to prune the grape by C. R. Ransom, who is known as one of the most careful and practical grape growers in this section. He said that allowing a young vine to overbear was likely to be very disastrous. A two-year vine had with him borne over thirty clusters and thereby been rendered almost worthless for several years; this year his crop from fourteen square rods was just one ton of fruit, or a yield of about eleven tons per acre. His vineyard is on a steep southeast hillside; soil a mixture of sand and yellow clay.

Geo. Gardner has several vines that produce very large crops; he does not practice pruning at all, believes in "letting nature take its course;" has one vine of Rogers No. 15 (Agawam) that this season produced just 100 pounds of grapes. The vine is kept up from the ground on a sort of horizontal trellis of stakes and twine; the vine covers rather less than one square rod of ground. He is inclined to assist nature a little in several ways, covers with earth to protect against our unnaturally cold weather, and uses a hoe and a natural man at the handle to eliminate unnaturally aggressive weeds. Peter Clausen thinks that too late summer pruning will injure the vine; Worden is one of his best varieties.

SECRETARY'S REPORT.

The secretary's report showed a past membership of thirty and a balance in the treasury of the society of \$15.70.

The following officers were chosen for the ensuing year:

President.....	F. W. Kimball.....	Austin.
Vice-President.....	Geo. H. Prescott.....	Albert Lea.
Secretary.....	Clarence Wedge.....	Albert Lea.
Executive Com.....	C. L. Hill.....	Albert Lea.
Executive Com.....	A. J. French.....	Austin.

The next meeting of the society is to be held in Austin.

WEDNESDAY AFTERNOON SESSION.

At the last session the discussion seemed to turn to the varieties of apples best adapted to the needs of southern Minnesota. Mr. Mitchell being called on for his list put Hibernial at the head and said that he considered it the best apple in this country to plant in this latitude; he places the Duchess next and is in doubt what to place following. C. G. Patten placed Duchess at the head with Patten's Greening, Hibernial, Good Peasant, Wealthy and Charlamof following. Mr. Gaylord put Hibernial at the head with Duchess, Malinda, Utters and Wealthy following, the two latter to be top-worked on Hibernial. S. D. Richardson would only name Duchess, Wealthy and Minnesota. C. F. Gardner's list was Duchess, Tetofsky, Patten's

Greening, Malinda and Longfield. Mr. Patten thinks Hibernial and Lieby are not identical varieties; Mr. Mitchell thinks they are. Patten's Greening was highly praised by Mr. Gardner.

In his paper on evergreens, Mr. Dartt said that the Norway spruce has seemed able to resist drouth better than the white spruce, but that the latter will stand more cold; the dwarf mountain pine is one of the best trees for the lawn, perfectly reliable. The arbor vitae does not endure drouth, even as an established tree. Red cedar should be grown from northern seed; has found it unreliable as usually procured from the nurseries. Edson Gaylord gave as his three best and most reliable evergreens, the white pine, white spruce and dwarf Siberian arbor vitae.

The meeting was then adjourned.

It will be seen by the proceedings that the society was honored by an unusually large and valuable number of visiting horticulturists. The display of fruits consisted of about fifty-six plates of very handsome and well colored apples. The Wealthy, Hibernial, Repka Malenka, Longfield, Minnesota, Haas and Patten's Greening being represented.

The citizens of Albert Lea, through the Commercial Club, furnished free entertainment to all members, and a suite of the pleasantest possible rooms right in the heart of the city. The attendance, while not all that had been hoped for, was much greater than last year, and all that could be reasonably expected. The local papers of both counties are publishing the papers read at the meeting, and thus new interest and endeavor in horticultural work is greatly stimulated. The membership fee of fifty cents will more than pay all the necessary expenses of maintaining the society and provide a small fund which may be used in several ways to benefit the members. In closing this report of our work, we would call the attention of the friends of trees, fruits and flowers all over the state to the benefits and joys of such local meetings. We ought to have a hundred such scattered all over the state.

LIST OF MEMBERS.

ANNUAL FEE, FIFTY CENTS.

C. R. Ransom.....	Albert Lea, Minn.	Lewis P. Peterson..	Freeborn, Minn.
H. E. Nelson.....	" "	P. H. Overgaard.....	Lerdal, "
Geo. A. Boye.....	" "	J. R. Page.....	Glenville, "
A. C. Arneson.....	" "	Freemont Snyder....	Freeborn, "
Geo. H. Prescott.....	" "	A. H. Street.....	Alden, "
Mrs. Geo. H. Prescott...	" "	A. J. French.....	Austin, "
Mrs. A. W. Massee.....	" "	F. Boelk.....	Lansing, "
P. Clausen.....	" "	John Smith.....	Lake Mills, Iowa.
Loren Blackmer.....	" "	John Guy.....	Oakland, Minn.
C. L. Hill.....	" "	F. F. Blackman.....	Alden, "
James Roulsten.....	Oakland, "	Clarence Wedge.....	Albert Lea, "
C. G. Patten.....	Charles City, Iowa.	F. S. Haupt.....	" "
E. H. S. Dartt.....	Owatonna, Minn.	G. Seebach.....	Austin, "
E. D. Ames.....	Lyle, "	E. B. Crane.....	" "
E. E. Budlong.....	Glenville, "	A. N. Kinsman.....	" "
S. D. Richardson.....	Winnebago City, "	F. W. Kimball.....	" "
James Taylor.....	Box 246, Austin, "	N. McColly.....	Winnebago City, "
Fred Mohl.....	Adrian, "		

HONORARY MEMBERS.

C. F. Gardner.....	Osage, Iowa.
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PROGRAM OF THE
TWENTY-EIGHTH ANNUAL MEETING
OF THE
Minnesota State Horticultural Society

TO BE HELD IN THE
MASONIC HALL, LAKE CITY, MINN.

TUESDAY, WEDNESDAY, THURSDAY and FRIDAY,
January 8, 9, 10 and 11, 1895.

LADIES ARE ESPECIALLY INVITED.

SEND OR BRING QUESTIONS FOR THE QUESTION BOX.

ANNOUNCEMENT.

In response to a most cordial invitation from the mayor and common council of Lake City, accompanied by a tender of "the use of a hall, and not only the key of the city but to our homes as well," reinforced by the urgent personal solicitation of its citizens, the twenty-eighth annual session of our society is to be held at Lake City, Minn.

This beautiful little city of some 3,000 population is located on the Mississippi river about sixty miles below St. Paul at the point where the river widens out and takes the name of Lake Pepin. With this broad stream in front and a circle of bluffs several hundred feet high in the rear, enclosing a few square miles of comparatively level and well drained soil, it occupies a position of much natural beauty; and, supplemented by the work of man in its broad, well shaded streets, lined with pleasant and comfortable homes, it is one of the most attractive of our many handsome Minnesota towns. (President Underwood, whose home, you know, is in Lake City, had nothing to do with writing this notice, if his name is appended, and did not see it until it was printed. Lay it to the secretary.)

The Chicago, Milwaukee & St. Paul railway is the only one running through the place, but close connections are made with this line at the towns of Red Wing and Hastings (and, of course, the Twin Cities) on the north and Wabasha and Minnesota City on the south, so that it is easily accessible. (It will pay you to be a little inconvenienced, if necessary, any way, to come to so pleasant a place and so good a meeting as we are sure to have.)

A very interesting and practical program has been prepared and, as usual, we shall have the companionship and assistance of our kindred societies, viz: The Minnesota State Bee-Keepers' Association and the Minnesota State Forestry Association, which convene at the same time and place.

Liberal premiums are offered for an exhibit and you are urgently invited to assist in making the display worthy of the occasion. Let each bring something to help out in this rather poor apple year in our state.

REDUCED RAILROAD RATES. READ CAREFULLY.

A reduction to one-third railroad fare for the return trip has been secured on condition that *one hundred certificates*, showing that full fare has been paid coming to this meeting, are presented to the railroad agent at Lake City. It is certain that this reduction can be secured if *each person attending* obtains such a certificate from the railroad agent at the time of purchasing the ticket. *Do not fail* also to get a similar certificate *at each transfer point* where you have to purchase a ticket on the way to the meeting. For instance, a member from Rochester must buy a ticket from Rochester to Red Wing, and again from Red Wing to Lake City; get a certificate at both Rochester and Red Wing. The certificate secured with the *last ticket bought* before reaching Lake City is the most important and the *only one* that will count in the required "one hundred."

N. B.—On reaching Lake City turn these certificates over to Sec'y Latham at once.

All the railroads in the state south of Minneapolis, also the Great Northern and the Northern Pacific railways, offer this reduced fare.

Trains for Lake City, leave Minneapolis via. O. M. & St. P. Ry. at 7:30 a. m., 2:15 p. m., 6:25 p. m., 7:30 p. m. Arrive in 2½ hours.

Returning (*going north*), leave Lake City at 6 a. m., 10:13 a. m., 1:08 p. m. and 8:38 p. m.

DO NOT FAIL TO GET CERTIFICATES.

ENTERTAINMENT.

Free entertainment is tendered to members, delegates and invited visitors at this meeting, (this, you see, includes everybody, as *any one* can become a member by paying the annual fee of one dollar), but, in order to secure this, you must notify the chairman of the committee on entertainment.

MR. JOHN W. KENNEDY, of Lake City, of your purpose to attend and the probable length of your stay, at least three days before the date of meeting, otherwise you *may* have to pay your own expenses. (For this occasion special rate of \$1.00 per day have been secured at the Lyon hotel.)

A committee of reception, wearing the badge of our society, will meet incoming trains during the meeting.

Come, *everybody* interested in any branch of horticulture! It is *your* loss if you stay away.

Will the papers of the state please give wide circulation to this notice?

For further particulars address

A. W. LATHAM, Secretary.

207 Kasota Bldg., Minneapolis.

J. M. UNDERWOOD, President,
Lake City.

TUESDAY MORNING SESSION—10 O'CLOCK.

GENERAL SUBJECT—GENERAL FRUITS.

Opening remarks by the president.

Appointment of committee on credentials.

Salutatory.—Old Ideas in a New Dress, J. S. Harris, La Crescent.

REPORTS OF COMMITTEE ON GENERAL FRUITS.

First Congressional District—Robt. Buttermore, Lake City, J. O. Walker, Rose Creek.

Second Congressional District—O. J. Hurt, Island Lake, J. T. Furber, Madelia.

Third Congressional District—P. F. Bradford, Empire, C. F. Brown, St. Peter.

Fourth Congressional District—W. H. Brimball, St. Paul, R. Knapheide, St. Paul.

Fifth Congressional District—Dr. M. M. Frisselle, Eureka, J. J. Baston, St. Louis Park.

Sixth Congressional District—C. L. Goodell, Barnum, John Bittman, Park Rapids.

Seventh Congressional District—J. P. V. Evans, Twin Valley, S. Jacobson, Tordenskjold.

Premiums on Growing Crops,

Dr. M. M. Frisselle, Eureka.

Entry of exhibits.

Announce renewal of membership. Annual fee, \$1.00. Pay to the Secretary.

ARE YOU A MEMBER?

TUESDAY AFTERNOON SESSION—2 o'clock.

GENERAL SUBJECT—GENERAL FRUITS, PLUMS, CHERRIES AND
EXPERIMENT STATIONS.

Reports of vice-presidents.

F. W. Kimball, First Congressional District, Austin.
S. D. Richardson, Second Congressional District, Winnebago City.
L. E. Day, Third Congressional District, Farmington.
R. S. Mackintosh, Fourth Congressional District, St. Anthony P'k.
J. H. Stevens, Fifth Congressional District, Minneapolis.
Mrs. Jennie Stager, Sixth Congressional District, Sauk Rapids.
J. O. Barrett, Seventh Congressional District, Brown's Valley.

Report of committee on nomenclature and catalogue.

J. S. Harris, Le Crescent, Prof. S. B. Green, St. Anthony Park.

Report of committee on fruit blossoms (cross-fertilization, etc).

C. W. H. Heideman, New Ulm. Prof. S. B. Green, St. Anthony Park.
O. F. Brand, Faribault.

Report of committee on seedling fruits.

J. S. Harris, La Crescent.

Spraying at the State Experiment Station.

R. S. Mackintosh, State Experiment Station.

Report of committee on plums and cherries.

J. M. Doudna, Alexandria, O. M. Lord, Minnesota City.
C. W. H. Heideman, New Ulm.

The Culture of Cherries.

Aug. Meier, New Ulm.

Reports of superintendents of experiment stations.

Prof. S. B. Green, Central Station, St. E. H. S. Dartt, Owatonna.
Anthony Park. F. H. Fiedler, Fergus Falls.
Dewain Cook, Windom. Clarence Wedge, Albert Lea.
Chas. W. Sampson, (grapes) Excelsior. O. M. Lord, (plums and small fruits) Min-
C. W. H. Heideman, (plums and small nesota City.
fruits) New Ulm. D. E. Myers, St. Cloud.
H. M. Lyman, (apples) Excelsior. J. S. Harris, La Crescent.
L. R. Moyer, Montevideo.

NOW IS THE TIME TO JOIN!

TUESDAY EVENING SESSION—7:30 o'clock.

GENERAL SUBJECT—ADDRESSES AND ANNUAL REPORTS.

Music.

Address of welcome.

F. C. Titzell, Mayor of Lake City.

Response to address of welcome.

E. H. S. Dartt, Owatonna.

President's annual address.

J. M. Underwood, Lake City.

Annual report of the executive committee.

Wyman Elliot, Chairman, Minneapolis.

Annual report of secretary.

A. W. Latham, Minneapolis.

Annual report of treasurer.

Ditus Day, Farmington.

Annual report of librarian.

(The library is at No. 207 Kasota Block, Minneapolis.) A. W. Latham, librarian.

E. A. Cuzner, assistant librarian.

(The assistant has charge of the reports stored at Pillsbury Hall, State University)

Music.

Horticultural Frauds.

E. H. S. Dartt, Owatonna.

The Home of Pliny.

O. F. Brand, Faribault.

The Rate of Growth of a Pumpkin.

A. P. Anderson, State University.

Report of committee on legislation.

J. S. Harris, La Crescent.

Col. J. H. Stevens, Minneapolis.

Wyman Elliot, Minneapolis.

F. G. Gould, Excelsior.

Appointment of committees on fruit list, award of premiums,
president's address, obituaries and final resolutions.

REMEMBER THE QUESTION BOX!

WEDNESDAY MORNING SESSION—9 o'clock.

GENERAL SUBJECT—APPLES.

Report of committee on apples. (Including crabs, hybrids, Russians, etc).

D. F. Akin, Farmington.

J. S. Parks, Pleasant Mounds.

Barnett Taylor, Forestville.

L. E. Somerville, Viola.

Chas. Luedloff, Carver.

Failure and Success in Apple Growing in Minnesota.

Wm. Somerville, Viola.

Nursery and Orchard Trees.

M. Pearce, Chowen.

Seedling Apples.

A. J. Phillips, Secy. Wis., State Hort. Socy, West Salem, Wis.

Apple Trees that are not Subject to Blight.

Chas. Luedloff, Carver

Fruit Trees.

Nels Anderson, Lake City.

The Orchards of Fairbault Co.

S. D. Richardson.

NEW MEMBERS ARE ENTITLED TO HORTICULTURAL PREMIUMS.

WEDNESDAY AFTERNOON SESSION—2 o'clock.

GENERAL SUBJECT—GRAPES AND SMALL FRUITS.

Report of committee on grapes.

C. W. Sampson, Eureka.

Wm. Wachlin, Faribault.

Mrs. I. Barton, Excelsior.

Vine Growing for Profit.

H. L. Crane, Excelsior.

Report of committee on small fruits.

M. Pearce, Chowen.

G. H. Prescott, Albert Lea.

Wm. Danforth, Red Wing.

Thos. Redpath, Long Lake.

Mrs. A. A. Kennedy, Hutchinson.

Small Fruits in Freeborn County.

G. H. Prescott, Albert Lea.

Small Fruits.

M. O. Bunnell, Newport.

Small Fruits from a Commercial Standpoint.

L. G. Kellogg, President Wis. State Hort. Society, Ripon, Wis.
Berries for the Northwest,

C. E. Toby, Sparta, Wis.

LIFE MEMBERSHIP FEE, \$10.00.

This may be paid in two equal annual installments.

WEDNESDAY EVENING SESSION—7:30 o'clock.

GENERAL SUBJECT—FLORICULTURE.

Music.

Report of committee on out-door herbaceous plants.

L. R. Moyer, Montevideo.

Mrs. M. E. Powell, St. Peter.

Mrs. L. E. P. Sprague, 225 8th ave. S. E., Minneapolis.

A Farmer's Flower Garden,

Miss Sarah J. Buttermore, Lake City.

Our Wild Flowers.

Miss Sara M. Manning, Lake City.

Report of committee on house and greenhouse plants.

Mr. Smith, Winona.

A. N. Kinsman, Austin.

Fred Windmiller, Mankato.

Report of committee on deciduous trees and shrubs, including roses.

J. P. Andrews, Faribault.

E. H. S. Dartt, Owatonna.

Wyman Elliot, Minneapolis.

Music.

How to Adorn Home Grounds, with illustrations.

F. H. Nutter, Landscape Architect, Minneapolis.

Report of committee on evergreens.

G. W. Fuller, Litchfield.

D. T. Wheaton, Morris.

Evergreen Trees.

E. H. S. Dartt, Owatonna.

The Movement of Sap in Plants.

Prof. D. T. McDougal, Minn. State University.

YOU SHOULD BE A MEMBER.

THURSDAY MORNING SESSION—9 o'clock.

GENERAL SUBJECT—IRRIGATION.

Studies of Rainfall in Minnesota in Connection with Irrigation.

Edwd. A. Beal, Supt. Weather Bureau, Minneapolis.

Possibilities of Irrigation in Minnesota.

D. R. McGinnis, Secy. St. Paul Commercial Club.

The Gas Engine in Garden Irrigation.

J. E. Empenger, Hopkins.

Irrigation from City Mains.

M. W. Cook, Rochester.

Irrigating Small Fruits with Windmill and Tank.

A. H. Brackett, Minneapolis.

Garden Irrigation by Rain and Reservoir.

G. H. Pond, Bloomington.

My Experience Irrigating Small Fruits with an Artesian Well.

E. E. Walcott, Sparta, Wis.

Sub-Irrigation.

F. H. Nutter, Minneapolis.

Notes on Irrigation and Drainage.

S. D. Richardson, Winnebago City.

Pump Irrigation in Minnesota.

Prof. W. M. Hays, State Experiment Station.

Report of committee on award of premiums.

Announce election for the afternoon and renewal of membership.

Annual fee, \$1.00. Life membership fee, \$10.00.

THURSDAY AFTERNOON SESSION—2 o'clock.

GENERAL SUBJECT—ELECTION OF OFFICERS, FRUIT LIST AND
VEGETABLES.

Report of committee on fruit list.

Report of committee on vegetables.

J. R. Cummins, Washburn.

C. L. Hill, Albert Lea.

E. M. Chandler, Minneapolis.

Wm. Lyons, Minneapolis.

A Farmer's Garden.

Wm. Somerville, Viola.

Melons on Sandy Soil.

L. H. Scofield, Bloomington.

Sweet Potato Culture in Minnesota.

J. R. Cummins, Washburn.

Garden Vegetables—a Greater Variety and Choicer Kinds.

C. L. Hill, Albert Lea.

4 o'clock—Election of officers.

The Requirements for Cranberry Culture.

H. C. Leonard, M. D., Minneapolis.

Vegetables for Profit.

Geo. Stout, Lake City.

Culture and Care of Asparagus.

R. S. Mackintosh, State Experiment Station.

THURSDAY EVENING SESSION—7:30 o'clock.

GENERAL SUBJECT—FORESTRY.

Report of committee on forestry.

J. O. Barrett, Sec. Minn. State Forestry Assn., Brown's Valley.

Wm. Somerville, Viola.

Rev. O. A. Th. Solem, Halstad.

Forestry and Evergreens.

Wm. Somerville, Viola.

Forest Fires.

H. B. Ayres.

Working Plans of Forestry.

O. F. Brand, Faribault.

Early History of the Forestry Movement.

Col. J. H. Stevens, Minneapolis.

Secretary report and the work in hand.

J. O. Barrett, Secy.

Address

Hon. S. M. Owen, Minneapolis.

Management of Ornamental Trees.

F. Nussbaumer.

The State and the Forest Problem.

C. L. Smith, Minneapolis.

(Subject not announced.)

L. H. Wilcox, Hastings.

Relation of Forestry to Pomology.

J. S. Harris, La Crescent.

International Forestry.

Wm. R. Dobbyn, Minneapolis.

Forestry and our Schools.

Prof. W. W. Pendergast, St. Paul.

Coniferous Evergreens from Seed.

Prof. S. B. Green, St. Anthony Park.

FRIDAY MORNING SESSION—9 o'clock.**GENERAL SUBJECT—BEE-KEEPING, ENTOMOLOGY AND ORNITHOLOGY.****Domestic and Commercial Fertilizers, their Comparative Value to Horticulture.**

Prof. Harry Snyder, State Experiment Station.

Report of committee on apiculture.

T. Theilmann, Theilmanton.

J. P. West, Hastings.

How to Keep Comb Honey after Taking from the Hives and the Wax Moth.

C. Theilmann, Theilmanton.

Report of committee on entomology.

J. S. Harris, La Crescent.

Prof. S. B. Green, St. Anthony Park

Earthworms.

Miss Rosa Gould, Lake City.

Insects Injurious to Horticulturists, if not to Horticulture.

Prof. Otto Lügger, State Experiment Station.

Report of committee on ornithology.

F. I. Harris, La Crescent.

Birds and their Relation to Horticulture.

Wm. T. Shaw, State Agricultural School.

FRIDAY AFTERNOON SESSION—12.30 o'clock.

Banquet tendered by citizens of Lake City. Responses to toasts by Prof. W. W. Pendergast, Prof. S. B. Green, Messrs. S. M. Owen, P. V. Collins, E. A. Webb and C. L. Smith, of the agricultural press, and O. C. Gregg, Col. J. H. Stevens and others whose names cannot yet be announced, etc. (Order of exercises to be announced later.)

Unfinished business.

Report of committee on obituaries and final resolutions.

4:30 P. M.—Two-minute speeches by the members.

5:00 P. M.—Closing remarks by the president.

PREMIUM LIST.

All exhibits must be entered with the secretary and in place by 2 p. m. of the first day of the meeting to be entitled to compete for premiums.

Exhibitors competing must be members of this society and the growers or makers of the articles exhibited. The articles exhibited must have been grown in Minnesota or manufactured from Minnesota grown products.

Each exhibit of fruit or vegetables must consist of five specimens, except when otherwise noted.

No premium will be awarded on unworthy exhibits.

APPLES.

	1st Prem.	2d Prem.
Collection.....	\$5.00	\$3.00
Each variety exhibited.....	1.00	.50
Seedling apple, never before exhibited.....	3.00	2.00

GRAPES.

Collection.....	5.00	3.00
Each variety exhibited.....	1.00	.50

PLANTS IN POTS.

Collection of ornamental and flowering plants.....	5.00	3.00
Single rose in bloom.....	1.00	.50
Single geranium in bloom.....	1.00	.50
Single begonia in bloom.....	1.00	.50
Single carnation in bloom.....	1.00	.50

CUT FLOWERS.

Floral design.....	5.00	3.00
Collection of roses.....	2.00	1.00
Collection of carnations.....	2.00	1.00
Table bouquet.....	2.00	1.00
Basket of flowers.....	2.00	1.00

VEGETABLES.

Collection—not less than ten kinds, one-half peck of each.....	5.00	3.00
Early potatoes, single variety, one-half peck.....	1.00	.50
Late potatoes, single variety do.....	1.00	.50
Onions, single variety do.....	1.00	.50
Turnips, single variety do.....	1.00	.50
Beets, single variety do.....	1.00	.50
Parsnips, single variety do.....	1.00	.50
Carrots, single variety do.....	1.00	.50
Celery, single variety.....	1.00	.50
Hubbard squash, (one specimen).....	1.00	.50
Cabbage, (one specimen) single variety.....	1.00	.50
Cauliflower, (one specimen) single variety.....	1.00	.50

PANTRY STORES. PRODUCT OF 1894.

Collection of canned fruits, one specimen of each.....	2.00	1.00
Collection of jellies do.....	2.00	1.00
Collection of pickles do.....	2.00	1.00

HONEY.

Collection of comb honey, <i>ad libitum</i>	5.00	3.00
Collection of extracted honey, do.....	3.00	2.00

Dealers in horticultural implements and appliances are invited to place them on exhibition.

**ANNUAL MEETING OF IOWA STATE HORTICULTURAL SOCIETY
NOVEMBER 21 TO 24, 1893.**

REPORT OF DELEGATE, J. S. HARRIS.

Iowa has for many years been a point of interest to us. First, because it is our neighbor on the south, and, at least, two lines of her northern counties have climatic condition very similar to those of southern Minnesota; second, because her leading horticulturists are men of marked ability, sterling integrity, wide awake and determined to succeed; and, third, because through her agricultural college she took the lead of all states in her endeavor to find good adapted fruits that would succeed in every part of the state and that could be grown by all her people, by sending Prof. J. L. Budd to Russia to look over and study the fruits of a region as inclement, and in many respects very similar to that of Iowa, Minnesota, and the Dakotas, and secure scions and plants and introduce them for trial and cultivation here. For more than one reason this was a wise move. It gave an impetus to tree planting that is destined to place her in the very front ranks as a fruit growing state, and supply all her people with an abundance of those wholesome fruits that go so far in making the life of the farmer comfortable and enjoyable. And as a financial venture it has proved a success. Five millions of dollars annually would not furnish her present population with a moderate supply of such fruits as can be produced there. Every dollar worth of that amount grown at home saves the cost of it to the state, and all surplus over their wants will bring in a revenue and furnish employment to many persons.

The meeting was held in the state house, where the society has a comfortable home, comprising a lecture room on the first floor for the meetings, a smaller room opening into it, which is used as a library and committee room, and a large room in the basement for exhibitions of fruits, the storing of surplus reports, etc. The lecture room is fitted up with stationary cases along one side and end, which are well filled with interesting object lessons of seeds, nuts and casts of fruits and vegetables from life; also a fine collection of woods from these and other countries and a great number of novelties and horticultural articles of interest, making altogether a horticultural museum of great value. The fruit and vegetable models were prepared by G. B. Brackett, of Denmark, Ia., who put up the exhibit of the fruits of America for the U. S. Dept. of Agriculture, that were shown in the government building at the late World's Fair. In connection with the meeting there was an exhibit of over 100 varieties of apples, comprising 455 plates, and a very creditable show of garden vegetables. The apples were of fine appearance for this off year of fruit.

Iowa under the management of its horticultural society, and working under great difficulties, made one of the largest and best exhibits of northern grown fruits shown at the World's Fair. They had upon their tables, in the middle of October, 3,500 plates of fruit, besides some elegant decorations, comprising, at that time, 402 varieties of apples, 25 of pears and over 30 of grapes; besides showing in their season 10 varieties of peaches and 59 of plums. To keep up

this wonderful exhibit from August to the close of the fair, required over 20,000 plates of fruit. The great number of varieties go to show that considerable experimental planting has been done, and that they are meeting with marked success in developing a pomology from which it may reasonably be expected that future planters can select a sufficient number of varieties that are adapted to their conditions and profitable to grow.

In the management of the society, the state is divided into districts (twelve in all), each having a director. These directors are elected at the annual meetings of the society for the term of two years, so arranged that the time of one-half expires each year. These directors have the oversight of the horticultural work in their respective districts, report at each annual meeting on the fruit crop of the year and the general condition of horticulture in their districts, and, as a whole, they constitute a board of management to which is intrusted the affairs of the society when not in session.

The meeting convened at 10 a. m. on the 21st of November, with President A. F. Collman in the chair. The morning session was mostly taken up with the reports of directors. The substance of the reports was that the apple crop was light in all parts of the state, in some parts almost a failure, and in only a few localities reaching a good half crop, with the quality only medium or under. Plums ranging from nearly a failure in three districts to poor in three others, and from a fourth of to a full crop in the remainder; but the fruit not being as large and fine as in some seasons, owing to the extreme drouth. Grapes were reported as from a good to an extra good crop, with fruit very superior in quality. Cherries very nearly a failure, except in one district (the tenth), where they were reported as good. Raspberries generally ranged from one-fourth to a full crop, averaging fair. Blackberries were a good crop in two districts, and ranged from total failure to one-half crop in others. Strawberries were a light crop all over the state, and currants almost a failure.

In every part of the state the Duchess of Oldenburg is commended as the most profitable early market apple and is still being extensively planted. In the southern half of the state the Ben Davis and Jonathan are taking the lead as winter varieties. Those fruit growers in localities where a system of co-operation has been adopted, are getting the best financial returns from the business, and it was a commonly accepted opinion that unless this system was generally adopted, small fruit growing must be much curtailed in the future, because the facilities afforded by cold storage, now coming into general use, puts local growers into direct competition with the fruits of distant growers from more favored localities and breaks down the market; while with co-operation they will be able to ship to distant markets and thus avoid the glut in the home market.

The director of the second district said: "I regret that I cannot report a general interest horticulturally, an interest that reaches out and takes hold of every owner of a plat of ground, however small, that he calls his home, and compels him to plant and care for fruit-bearing vines and trees." It is his opinion that fruit raising is confined to too narrow a limit and not followed with sufficient knowl-

edge. Many who are trying to replace their old orchards do not have the courage to begin in a new place, but make the mistake of planting here and there in the sod of the old orchard, and meet with nothing but discouragement and defeat. This is too true, not only in Iowa but in our own state, and with other as well as orchard fruits. It is unwise and unprofitable. The true policy is to make new plantings on new grounds as soon as the old ones become unprofitable, using for the purpose only young and healthy trees and plants of the best varieties, and giving them intelligent care.

In a discussion on strawberries several gentlemen spoke very highly of the Bederwood as being one of the most promising of the newer varieties, it proving one of the most healthy growers and productive varieties; also, as being one of the most valuable pollenizers for the Warfield, Crescent, Bubuch and some others; and with some growers, last season, it led all others in yield of fruit, with Warfield, Crescent, Bubuch and Capt. Jack but little behind.

The merits of the Japanese wineberry were discussed, and the conclusion seemed to be that it was utterly worthless for cultivation in Iowa, except as a curiosity. It is simply a small, poor raspberry with a husk, and is not hardy, yet nurserymen continue to sell it as a wonderful fruit, and the people buy and plant it.

In the afternoon, J. C. Ferris, of Hampton, read a paper on the subject of "Commercial Orcharding in Northern Iowa," in which he took the ground that there was no more profitable branch of farming than raising apples. One prime cause of failure was that so many orchards were planted with varieties that had no business there, and on unsuitable sites and soils, and were never cared for. The requisites for a successful orchard are elevated sites, clay soils, honest nurserymen and intelligent orchardists.

M. J. Graham, of Adel, followed with a paper upon the same subject, and gave much excellent advice to those who intend to go into the business, and referred them to the reports of the society as one of the best sources for gaining information. He spoke as one having full confidence in the fruit-producing capacity of the state.

The evening session was devoted largely to the president's address and papers by lady members. President F. A. Collman in his address reviewed the discouragements of the past year that had everywhere obstructed the way, alluded to the almost total failure of fruit in many sections, and the very general shortage everywhere, little more than a half crop being harvested in the most favored locality. Yet, he said, "never in the history of our state—if in the history of our country—was there a table loaded with a hundred bushels of more highly colored apples than was shown on ours at the late World's Fair, and thousands of visitors were surprised to find that the young state of Iowa was at the head of the great fruit states of America." He said that a record kept in alphabetical order showed in their exhibit 372 named varieties of apples, 30 unknown and seedlings, and 25 crabs. This to him was an alarming state of things. The tree men had done their people a great injustice in propagating and selling such numbers of varieties as were unprofitable to plant. They were no longer in the experimental stage, but it was an established fact that with adapted varieties they could grow better

apples and more of them to the acre than any other state in the Union. Their society was a state society supported by the people, and it was their duty to educate them along all the lines of horticulture, or their usefulness would cease or only be found recorded on the pages of past history. He estimated that more than \$1,000,000 was invested in horticulture within the bounds of the state, and recommended that a competent committee be appointed in each district, whose duty it should be to revise the fruit lists and recommend for future planting only such varieties as have proved profitable and are adapted to their locality. "The time has arrived when this can be done. We have varieties that are a success in every part of the state,—varieties that are good only in certain localities, and varieties that are nearly worthless everywhere. It is our duty to prepare such lists and scatter them broadcast."

In concluding his address, the president gave some excellent advice to those who would plant orchards. He said that good home grown trees could always be found within a short distance of every planter's home, and they could be purchased at living rates; so that the trees to plant an acre need not cost to exceed fifteen dollars, and with good care only a few years, they would richly reward the planter. At a low estimate, they should, at the end of twelve years, average four bushels per tree; and what could be done with the land that would pay so well? But some will say, "In a few years the fruit business will be overdone, and there will be no market for it." My answer is, "It would be a great blessing if the millions of hungry children of the world could all be supplied with enough good fruit." But there is nothing to fear on that score. Having proper varieties of fruit and healthy trees to produce the best quality, if it is carefully picked, honestly packed, judiciously handled and put upon the market in the neatest and best possible condition, it will always sell for more than the cost of production, and we will have a market for more than we can raise."

Following the president's address the secretary read his annual report. In it he alluded to the causes of the failure of the last crop of apples and other fruits, and attributed it largely to the scab fungus diseases that prevailed so generally throughout the country in 1892, badly injuring the foliage, weakening the growth and preventing the storage of proper nutriment for the production of a crop this season.

Miss Etta L. Budd, director of the Melrose Art School of Des Moines, followed with a paper on "The Laws of Color in Flowers." The laws of color in flowers were so clearly explained that the audience were instructed and edified. At the close she presented a series of rules for making floral designs to secure the richest harmony.

Mrs. H. Oslome, of Ames, read a valuable paper on "What Woman has done for Horticulture," and cited a number of instances where women are making a good livelihood in the various branches of fruit and flower culture.

A paper by Mrs. L. H. Pummel, of Ames, on "Fruit as a Diet," illustrated the importance of the daily use of fruit as a means of promoting health. It was a very able paper.

The evening program closed with a paper, "Are Plants Healthful in Living Rooms," by Miss Mary A. Nichols, a graduate of the Iowa Agricultural College. The results of the latest scientific researches on the subject were presented to the audience in a clear and convincing manner. An agricultural education has not taken a single charm from the appearance of the lady. She is a clear, forcible writer and reads with the eloquence of a trained elocutionist. Very seldom does an audience receive so much that is practical, as well as pleasing, in one session as was given to the Iowa horticulturists on this evening.

The sessions of the second day opened with a larger attendance from the more remote parts of the state. The program for the day was very full, and the papers and addresses of rare excellence. The "Methods of Cultivation to Produce Plant Food" was introduced by Prof. D. A. Kent, of the State Agricultural College, in a well written paper showing what constituted the elements of plant food, where they are found and how they are made available. He showed up the benefits of good drainage and thorough cultivation, both of which tend to make plant food available, and a frequent shallow cultivation provides a soil mulch which conserves moisture, promotes aeration and narrows the extremes of wet and drouth.

Charles Root, of Hopkinton, read a paper on "Small Fruits," under the headings of planting, cultivating old and new varieties, fertilizing the soil, spraying and winter protection. The points are, let each plant be set as carefully as if it was the only one you had, guarding against the roots getting dry—he does not believe in fall planting anything; and holds that one plant or tree well set is worth three carelessly done. Twice a week is none too often to cultivate, especially in time of drouth, when most people fail to give it because there are less weeds to kill. Barnyard manure is better than commercial fertilizers for small fruits, and the best results come from land that has been heavily manured two or three years before and cropped with corn and potatoes. For winter protection cover reasonably early, as the root growth will go on after the tops are covered; he uses strawy manure with dirt over it for blackberries. In selling, never send a box to market that is not ripe enough to put upon your own table at supper; do not put the best berries on top and be careful that no green or poor berries find their way into the box; use clean, tasty packages, and the home market for you is made—for people will quickly find you out, and use more berries when they are sure they are all ripe and alike all through the box. He considers Warfield, Crescent and Haverland the most profitable varieties, with Bederwood as pollenizer.

"Evergreens for Shelter," was discussed in a paper by C. F. Gardner, of Osage. To form the best shelter belt they should be set out in single rows with nothing to crowd them on either side of the row. They will then grow with limbs close to the ground and always retain them. White pine may be set twelve feet apart in the row, and if more than one row is used the rows should be from thirty to forty feet apart. Norway spruce should be set six to eight feet apart and the rows twenty or thirty feet apart. Scotch and Norway pine should be given the same distance as the white. A single row

is worth more as a windbreak than a dozen set in the common way, because if rows are planted close together the lower limbs are soon lost. Three rows thus set are amply sufficient to protect the house and out-buildings on any farm from winds and snowdrifts.

"Our Native Fruits" was the title of a paper by B. Mathews, of Knoxville, in which he maintained that from a horticultural standpoint our native fruits have great possibilities, and that from them can be developed through cultivation, selection, crossing and hybridizing many fruits of great value for the Northwest. Other papers on "The Definite Annual Growth and its Relation to Hardiness" and "Fruit from the Health Standpoint" completed the papers of the day in which the general public will be interested.

The election of officers for the ensuing year took place in the evening and resulted in the re-election of A. F. Collman, of Corning, president and J. L. Budd, of Ames, secretary.

On Thursday, November 22d, the society held three long sessions and put in a faithful day's work. The first paper was on "The Stone Fruits" by J. L. Budd. He stated that over a large portion of the central prairie section of Iowa, the native sorts of plums and some of the Russians were well laden with fruit, but the long continued drouth following the spring rains so affected the fruit that it was dwarfed in size and lower in quality than in any previous year since our present varieties have been cultivated. The fine specimens shown at Chicago were grown on the loose soil of the west slope on sites in the prairie district and on the bluffs with a deep porous sub-soil or in neighborhoods favored with timely showers. The lesson drawn is that the most favorable sites for plum growing are on soils underlaid with a porous sub-soil, permitting the ascension of moisture from below. Yet, he says, we now have varieties of the plum which every home owner in the state can plant with a reasonable certainty of gathering paying crops four years out of five. High culture and rich manured soil gives the best returns of fruit. Trees in bluegrass sod on poor dry soils in such a season as the last do not produce fruit worth gathering. Heading in or shortening the annual growth of stone fruits has been tried with good result. It is done during the leafless period. The effort is to give a more compact top that shelters the fruit from hot suns, and saves the branches from becoming sunburned. A trial of apricot seedlings for stocks for root grafting plums proved a bad failure, but experiments with the sand cherry for stocks would indicate that all kinds of plums take well on them. In this country few trees have been grown from root cuttings, but these few confirm the belief so common in Europe that trees thus grown are hardier and longer lived, and that they bear better than trimmed or grafted trees.

Among other good things presented during the day were papers on "Horticulture from a Climatic Standpoint," "Best Fruit Soils," "Fruit Lists", etc.

The attendance is said to have been a little less than the average, owing to the meeting being held a little too early in the season, and the next meeting is to be held on the second Tuesday of December. Our Iowa neighbors are very sanguine that fruit culture will in the near future be one of the leading industries of their state.

Although they apparently need it less they receive considerable more aid from the state than our Minnesota legislature is disposed to grant us. They receive annually from the state the sum of \$2,500. They have at the present time four district societies, each of which receives from the state \$150 per annum; and twelve experiment stations, situated in various parts of the state, are enabled to do some good work through aid extended by the society.

WISCONSIN STATE HORTICULTURAL SOCIETY. REPORT OF DELEGATE TO SUMMER MEETING, 1893.

J. S. HARRIS, LA CRESCENT.

The annual summer meeting of the Wisconsin Horticultural Society for 1893 was held at Kilbourn City on June 20th and 21st. A fine program had been arranged for the occasion, which was fully carried out. The attendance of the older members of the society and the larger fruit growers was light; while the attendance of the members of the local society of Columbia county and of the citizens of Kilbourn City was very good. Free entertainment was furnished for all visiting members.

As usual, at meetings of this society, the literary exercises were of the highest order, including a very cordial address of welcome by J. E. Jones, editor of "Mirror and Gazette," and response by the Secretary, B. S. Hoxie, in which he spoke in glowing terms of the Wisconsin horticultural exhibit at the World's Fair, also the growing interest in horticulture among the children of the state, which is being promoted through the very general observance of Arbor Day in the public schools and the free distribution of plants among the children by President Thayer—which this season amounted to thirty thousand. The papers read were able productions upon timely topics. Among them was one on "The Possibilities of Horticulture," by Prof. Chester W. Smith, principal of the public schools of Kilbourn City, "Roses for the Garden," by J. E. Wright, of Baraboo, "Small Fruits and their Necessity in the Family," by Mrs. Franklin Johnson, of Baraboo, and many others, together with short papers and reports by delegates from local societies, and a free discussion on strawberries. In connection with the meeting was an exhibit of fruits and flowers.

The most prominent and attractive feature of the exhibition was the display of flowers, including roses of the rarest varieties, carnations, peonies, pansies and bouquets of wild flowers in great profusion. This society offers premiums at their summer meetings to children under sixteen years of age for bouquets of cultivated and collections of wild flowers, named and tastefully arranged, which adds much to the interest and attractiveness of its meetings, and also enlists the attention and proves a valuable educator of the young people.

The largest exhibits of strawberries were made by J. E. Kellogg, of Janesville, and M. A. Thayer, of Sparta, each showing about thirty varieties. I. Boist, of Kilbourn City, showed about a dozen very fine varieties, and besides them, there were quite a number of

amateur exhibits of from one to three varieties. Mr. Thayer carried off the blue ribbon on greatest and best variety and Mr. Kellogg the red one. Mr. Thayer was also awarded first on best variety for general cultivation (Warfield), and Mr. Bost first premium for best quart of any variety, the Jessie being the lucky variety. The first premium on new seedling never before exhibited went to Mr Herbst, of Sparta. The variety is a cross between the Warfield and Jessie, has a perfect blossom, is a vigorous grower, very productive and promising in many other desirable qualities.

Among varieties shown, the Van Deman held its place as the most promising very early variety. Other most promising of the newer varieties, were Haverland, Bederwood, Crosby's No. 27 and Stayman No. 1. Reports from exhibitors and delegates placed the crop as considerably below the average in quantity and quality, and the outlook for a fair crop of other fruits is not very flattering.

A novelty of this meeting was the offering of prizes for the best report of the meeting by pupils of the public schools. The first prize was awarded to a girl of thirteen, and the second to one fourteen years old. A portion of the second day was spent on a steamboat excursion through the dells of the Wisconsin river; and altogether the meeting was a pleasant and profitable one, and the hospitality of the people of Kilburn City will be long and pleasantly remembered by visiting members.

ANNUAL MEETING SOUTH DAKOTA STATE HORTICULTURAL SOCIETY, DEC. 11-13, 1894.

ALFRED TERRY, DELEGATE, SLAYTON.

The annual meeting of the South Dakota Horticultural Society was held at Vermillion, Clay county, S. D., Dec. 11, 12 and 13, 1894.

The attendance was very small, but among them your delegate noticed such persistent fruit growers as Hon. Geo. H. Whiting, of Yankton; H. C. Warner, of Forestburg; Prof. L. C. Corbett, of Brookings (who, by the way, expects to attend our own meeting in January, 1895); E. D. Cowles, of Vermillion, and many others whose names will live in the horticultural world long after they have passed into eternity.

There was a magnificent show of chrysanthemums, from the most delicate shades to the darkest varieties. These were all cut flowers, and formed an object lesson for Mr. H. C. Warner's talk on their propagation and care. This excellent talk made your delegate determine to add to his present small collection this hardy and beautiful flower, the queen of the autumn.

On another table was an array of preserved fruit, not large in quantity, but perfect in quality. Then came the long table of fruits. This was a sight to behold. Think of it! Away off in the state of South Dakota—the land said to be (?) the land of drouth and of blizzards, and where summer is said to enter only when winter waits to catch a second breath. Right in her midst, home grown, fine samples of about fifty varieties of apples, many of plums and other northern fruits. Such an exhibition is a convincing argument that the state can and will stand a peer of the best state in the Union.

At one end of the table were three or four specimens of Washington apples, quinces and prunes, brought by a lady who had evidently expected to excite admiration for the fruit grown in a real fruit state; but the reverse was the result, for the South Dakota specimens equaled them in beauty, and generally beat them in quality. During your delegate's attendance at this meeting, he did not hear one word of discouragement about fruit culture.

The finest seedling apple noticed was one grown by a Mr. Michaelson—green, medium size; round, slightly flattened; short stem. Had the season not been so dry, this seedling would probably have grown as large as a Wealthy.

E. S. Collar discoursed on the subject of Russian apples, recommending the Hibernial, Wealthy and Duchess as about the best. A Mr. Hanson here gave his experience with a certain agent at Vermillion, of a well known nursery in Minnesota, who, on being asked if he had some iron clad Russians replied, that he had, but they were very dear indeed. This did not deter Mr. Hanson from ordering three varieties of these expensive trees; but not one tree sent was true to name, and all turned out to be Hibernial, Wealthy or Duchess.

The Black Hills fruit farm of a Mr. Thompson was spoken of by Mr. H. C. Warner, who visited it. On the farm there are 900 apple trees, of which 700 are in bearing. A portion of them are irrigated; all are clean and healthy and quite free from any disease. Your delegate visited the grounds that are under the care of Secretary Cowles. These are about one-half mile east of Vermillion. There were to be seen handsome black walnuts twenty years old, with trunks fourteen and sixteen inches in diameter; the soft maple, set trees, nine feet in circumference at a height of four feet from the ground; the Scotch pine, the red cedar and arbor vitae; plum trees of every northern kind; and last, though not least, a large apple orchard, many of the trees being of perfect shape, their lower branches stretching in every direction six to eight and ten feet. Most of these were very heavily laden with fruit this season. Among the many kinds I noticed, the best shaped tree was a Ben Davis. Here, too, grows the Famuese, Perry Russett, Wealthy, Hibernial, Duchess and many others, including seedlings. Considerable ground is given over to the plum. Mr. Cowles has a seedling plum of which he is very proud; it is oval, of good size, bright yellow and free stone. He says it was a seedling that grew between a Miner and a Peach plum and probably partakes of both. This is a very promising seedling and will probably be much heard from hereafter.

Three or four kinds of pears are grown in the southern part of the state, the hardiest of which are Flemish Beauty and Bartlett.

The tree culture was another subject much discussed, Hon. J. H. Whiting leading in the discussion and bravely defending the much abused cottonwood. Mixed groves were unanimously recommended, and box elder was considered the best "nurse tree," especially for the ash. Red cedar was considered very hardy indeed, and white birch, black cherry, elm, ash and Scotch pine were recommended as a mixture to set on a five-acre grove. To this list, however, almost every northern tree was added.

Your delegate was the medium through which the South Dakota society complimented your society by electing him an honorary member for two years. He was treated with marked courtesy, and he feels sure that much good can be given and received by such visits, especially if the delegation chosen were better horticulturists

than in the present case; however, your delegate felt proud of your association when he remembered the wonderful show of fruits and flowers he has seen in the Minnesota meetings, of the assistance in this good work given by our legislature, of the "Horticulturist" published monthly, of its large list of members and of the good it has done.

The society your delegate visited is without state aid, and as a result publishes no reports and is known only to a few of the citizens. Yet, with all this, I met many horticultural heroes, of whom I named a few at the commencement of this report, who are at their own expense and labor pushing the battle to the wall, and I feel sure that ere long the state legislature will see the benefit of horticulture to the state and will make a proper appropriation for its advancement.

The benefit of "Experimental Horticulture" was shown in a very able paper by Prof. Corbett, and Mrs. Cowles' paper on the "Flower Garden" was very interesting and instructive.

Obituary.

IN MEMORIAM.

Mrs. Carrie Dartt, wife of E. H. S. Dartt, Owatonna, Minn.,
Died December 6, 1894.

The funeral services of Mrs. Carrie Dartt, wife of E. H. S. Dartt, were held at their home last Saturday at two o'clock p. m. and were attended by a large gathering of friends of the deceased. She was born in Somersetshire, England, August 25, 1843, and came to this country with her parents at the age of six years, settling in Kingston, Wisconsin, where she lived until her marriage with Mr. Dartt and consequent removal to Owatonna. She has been suffering from poor health for a number of years and was under treatment for some time in Minneapolis two years ago but without permanent relief. In the early summer she became much worse and since August 25th, has been under treatment in the institution at Rochester where she died on Thursday, December 6th. Her disease seemed obscure, and at the last seriously clouded her mind, though she continued to recognize her family and friends. She leaves, besides her husband, only one child, a young man seventeen years of age. Of her parents' family there remain one sister in England and a sister in Janesville in this state, Mrs. J. H. Miner, also a half brother and a half sister in Wisconsin. The remains were brought home for burial and were interred in Forest Hill cemetery.

In this sad bereavement, Mr. Dartt has the full sympathy of his large number of friends in the ranks of this society. We will help to bear each other's burdens.

Secretary's Corner.

ANSWER TO QUESTIONS.—Can you answer any of the questions that have been asked in late numbers? Please do so briefly, and they will be published.

FRUIT FOR THE WINTER MEETING.—There are so few apples, this year, that to make an exhibit *every one* must bring or send what he has. Let us make a creditable show, even at some inconvenience to to ourselves.

MINNESOTA STATE FORESTRY ASSOCIATION.—The secretary of this association, Mr. J. O. Barrett, wishes the announcement made that the annual election of officers for that society will be held at Lake City, January 8, next.

CLOTH BINDINGS FOR THE LIBRARY.—Seventy-five paper bound volumes have been lately bound in cloth and now appear on its shelves in this form. Others are to follow. There should be no paper covered books in our permanent library.

A CORRECTION.—Through an error in reporting, Pres. J. P. West, of the Bee-Keepers Association, is recorded on page 333, Oct. No., as reading the "Presidents Annual Address." The title of the article should have been "Adulteration of Honey," as announced in the program.

The State Forestry and State Bee-Keepers' Associations meet at Lake City at the same time as the Horticultural Society, but in getting certificates from the railroad agents, those attending the first two associations must have them read "to the Horticultural Society" *or they will be of no use.*

REDUCED RATES TO ANNUAL MEETING.—The program of our annual meeting, published in this issue, calls special attention to the conditions under which reduced rates are offered to those in attendance. They must *pay full fare coming*, and at the time of buying the ticket a certificate must be procured of the agent, showing that this has been done. If a second or third ticket has to be bought at transfer points on the way, in every case get a similar certificate. Those certificates must be handed to Secretary Latham immediately upon arrival, and when he gets one hundred they can be counter-signed so a return ticket can be bought for one-third rate.

There will be no difficulty in getting the required one hundred, provided *every one* remembers to get their certificates.

If any purchase regular round trip tickets, get a certificate *just the same*. It will count in making the one hundred.

PROTECT THE TREE BUYER.—“I hope at the coming annual meeting we may have a good attendance of nurserymen and that we can agree upon a law that shall be framed with special reference to the protection of the average buyer of nursery stock. I know there is much sport made of his mistakes and general greenness, but think it is rather dear sport for us home nurserymen.”—Clarence Wedge.

ENTERTAINMENT AT LAKE CITY.—Don't neglect to notify Mr. John W. Kennedy of Lake City, chairman of entertainment, by Jan. 1st, as to the length of your stay there, that they may have ample time to make preparation for us. They don't know whether to count on fifty or one hundred and fifty. We hope it will be the latter number, and it is more likely to be.

Don't miss this meeting! If you are a little hard up and feel too poor, come, just the same. To stay away would be a “penny wise, pound foolish” policy. You will learn very much, and especially the things you most need to know; and above all, you will “absorb” inspiration, and go home full of renewed courage. Let nothing keep you away!

VARIATION FROM BUDDING.—In the museum of the Southern Illinois Normal University is an exceedingly interesting exhibition of bud variation, or sport, in pears. It consists of a specimen fruit of the Howell pear from the parent tree, this specimen measuring eight and one-half inches in circumference with stem one and one-fourth inches long. This is about the normal size of that fruit.

Also two fruits from the budded tree. These fruits are five and one-fourth inches in circumference with stems one and three-fourths inches in length. The fruit on the parent tree grows singly, on the budded tree in groups or clusters of two or three. The budded fruit is not so perfect in development as and the shape differs from that of the parent.

The flavor of the fruit from the two trees is similar. The stock was three or four inches in diameter and the buds were inserted in the limbs. The fruit from all of the scions was alike. No fruit growing from the stock.

These specimens were collected and preserved by Prof. George H. French of the S. I. N. U. from the farm of George Elliott, about six miles southwest of this city.

FRANK D. WILLIS, of St. Paul.

Carbondale, Ills., Dec. 18, 1894.

Question Box.

(In replying to a question, give its number.)

9. What is the best way to plant apple seed to make it grow? I have tried for four years and only successful the first year.—E. C. King.

Annual Meeting, 1894.

PROGRAM.

Of the twenty-seventh Annual Meeting of the Minnesota State Horticultural Society, to be held in the Lumber Exchange, corner Fifth street and Hennepin avenue, Minneapolis, Minn., Tuesday, Wednesday, Thursday and Friday, Jan. 9, 10, 11 and 12, 1894. Keep this program for use at the meeting. The ladies are especially invited. Don't forget the question box, which may fill every spare moment.

ANNOUNCEMENT.

The past year has not been on the whole very favorable for the Minnesota horticulturist, the yield of fruit in many classes being the poorest for several years. If there is a time when we especially need to get together to compare experiences and gather inspiration, it is at the close of such a season.

This is to be in an unusual degree a "home" meeting, and in preparing the program care has been taken to leave plenty of time for discussion of the subjects of most interest to those engaged in horticulture as a livelihood. Few papers have been solicited for the "fruit" portion of the program, the intention being to occupy the time largely with reports and discussions.

The usual liberal premium list has been prepared. You are urgently requested to assist in making this exhibit. An assortment of apples from the World's Fair exhibit has been stored at Chicago, which it is hoped may be in good condition for this occasion.

The Minnesota Bee-Keepers Association will convene in an adjoining room during a portion of the time of this meeting.

A reduction to one and one-third railroad fare has been secured, which will be available, however, *only in case two hundred and fifty persons attend* who hold receipts or certificates showing that they have paid full fare to the place of meeting. *Do not forget*, then, in purchasing ticket to call for a certificate from the agent showing that you have bought a full fare ticket to the meeting of this society.

It is no more than fair to say that there is no reasonable probability that the required number will be present to secure this reduction; and this notice is published more for the purpose of calling your attention to the present attitude of the railroads. But do not let this keep you at home. You will be royally welcomed, and we shall have as usual a "*grand good time*." You *cannot* afford to lose it.

Members, delegates and visitors reaching the city previous to the opening of the meeting are invited to call at the library, Room 2, No. 427 Nicollet avenue, which is the headquarters of the committee on reception.

Papers publishing this program or calling attention to this meeting and sending the secretary a marked copy of the paper containing the notice, will receive, when published, a bound copy of the proceedings.

J. M. UNDERWOOD, President,

A. W. LATHAN, Secretary,

Lake City.

1908 Lyndale Ave. S., Minneapolis.

PROGRAM.

TUESDAY MORNING SESSION—10 o'clock.

General Subject—Small Fruits.

Prayer.

Opening remarks by the president.

Appointment of committee on credentials.

Report of committee on small fruits—M. W. Cook, Rochester; E. E. Harris, La Crescent; Wm. Robinson, Hastings; B. C. Yancey, Edina Mills; O. M. Lord, Minnesota City.

Suggestions on Small Fruit Culture—M. W. Cook, Rochester.

New Strawberries—J. G. Kellogg, Janesville, Wis.

Profits of Small Fruit Culture—C. W. Sampson, Excelsior.

Entry of exhibits.

TUESDAY AFTERNOON SESSION—2 o'clock.

General Subject—Grapes, Plums, Cherries and Irrigation.

Report of committee on grapes—P. H. Perry, Excelsior; H. J. Ludlow, Worthington; M. Pearce, Chouen.

Report of committee on plums and cherries—Jos. Wood, Windom; Mrs. A. A. Kennedy, Hutchinson; H. Knudson, Springfield.

Native Plums and Their Development—O. M. Lord, Minnesota City.

The Sand Cherry as a Stock for Plum and Cherry—Prof. N. E. Hansen, Ames, Ia.

Conservation of Moisture in the Soil—Prof. S. B. Green, St. Anthony Park.

Irrigation in Minnesota—Hon. S. M. Emery, Bozeman, Mont.

Irrigation Applied to Minnesota—A. W. Sias, Pueblo, Col.

TUESDAY EVENING SESSION—7:30 o'clock.

General Subject—Addresses and Annual Reports.

Address of welcome—W. H. Eustis, Mayor of Minneapolis.

Response to address of welcome—W. W. Pendergast, State Supt. of Schools.

President's annual address—J. M. Underwood, Lake City.

Annual report of secretary—A. W. Latham.

Annual report of treasurer—Ditus Day, Farmington.

Annual report of librarian—(The library is at room 2, 427 Nicollet avenue, Minneapolis)—A. W. Latham, librarian; E. A. Cuzner, assistant, Essex and 27th avenue S. E., Minneapolis. (The assistant has charge of the reports stored at Pillsbury Hall, State University.)

The Horticulturist as a Reformer—Wm. R. Dobbyn, Minneapolis.

Wind—E. H. S. Dartt, Owatonna.

The Climate Changes of Minnesota—Prof. C. W. Hall, State University.

Report of committee on legislation—J. H. Stevens, Minneapolis; Wyman Elliot, Minneapolis; F. G. Gould, Excelsior.

Appointment of committees on fruit list, award of premiums, president's address, obituaries and final resolutions.

WEDNESDAY MORNING SESSION—9 o'clock.

General Subject—Apples and General Fruits.

Prayer.

Report of committee on apples (including crabs, hybrids, Russians, etc.)—D. K. Michenor, Etna; G. W. Buffum, Owatonna; W. L. Parker, Farmington; Wm. Duffus, Lake City; W. S. Widmoyer, Dresbach.

Laying Out an Orchard—S. D. Richardson, Winnebago City.

Report of committee on seedling fruits—J. S. Harris, La Crescent.

Report of committee on general fruits—

1st Congressional Dist.—C. Theilmann, Theilmanton; R. C. Keel, Rochester.

2d Congressional Dist.—J. S. Parks, Pleasant Mounds; F. S. Livermore, Fairmont.

3d Congressional Dist.—D. F. Akin, Farmington; E. J. Cutts, Howard.

4th Congressional Dist.—M. C. Bunnell, Newport; J. G. Bass, Hamline.

5th Congressional Dist.—H. L. Crane, Excelsior; D. V. Plants, Long Lake.

6th Congressional Dist.—J. M. Doudna, Alexandria; John Hunter, Anoka.

7th Congressional Dist.—N. P. Aspinwall, Harrison; Erik Anderson, Lake Park.

WEDNESDAY AFTERNOON SESSION—2 o'clock.

General Subject—General Fruits.

My Endeavors to Raise Fruit—D. F. Akin, Farmington.

What Fruit can Farmers Most Profitably Grow?—E. H. S. Dartt, Owatonna.

Report of committee on nomenclature and catalogue—J. S. Harris, La Crescent;
Prof. S. B. Green, St. Anthony Park.

Report of committee on fruit blossoms (cross-fertilization, etc.)—O. F. Brand,
Faribault; Dr. M. M. Frisselle, Eureka; R. S. Mackintosh, Langdon.

Reports of superintendents of experiment stations—

Prof. S. B. Green.....Central Station, St. Anthony Park

E. H. S. Dartt.....Owatonna

F. H. Fiedler.....Fergus Falls

Dewain Cook.....Windom

Clarence Wedge.....Albert Lea

Chas. W. Sampson (grapes).....Excelsior

O. M. Lord (plums and small fruits).....Minnesota City

C. W. H. Heideman (plums and small fruits).....New Ulm

D. E. Myers.....St. Cloud

H. M. Lyman (apples).....Excelsior

J. S. Harris.....La Crescent

L. R. Moyer.....Montevideo

Reports of vice-presidents—

Clarence Wedge, First Congressional District.....Albert Lea

S. D. Richardson, Second Congressional District.....Winnebago City

L. E. Day, Third Congressional District.....Farmington

R. S. Mackintosh, Fourth Congressional District.....Langdon

J. H. Stevens, Fifth Congressional District.....Minneapolis

Mrs. Jennie Stager, Sixth Congressional District.....Sauk Rapids

J. O. Barrett, Seventh Congressional District.....Browns Valley

Reports of local societies.

WEDNESDAY EVENING SESSION—7:30 o'clock.

General Subject—Floriculture.

Report of committee on deciduous trees and plants—C. L. Smith, Minneapolis;
Dr. J. R. Walker, Loomis, Wash.; C. W. H. Heideman, New Ulm.

Our Native Shrubs and Vines for Ornamental Planting—C. L. Smith, Minneapolis.

Report of committee on out-door herbaceous plants (native and exotic)—Miss
Sara M. Manning, Lake City; Gust. Malmquist, Fair Oaks, Minneapolis; Mrs.
A. B. Underwood, Lake City.

Report of committee on horticultural structures and implements—J. M. Under
wood, Lake City; L. L. May, St. Paul.

Plant Room for the House—J. M. Underwood, Lake City.

Report of committee on house and greenhouse plants—Mrs. M. E. Powell, St.
Peter; Miss Francis E. Hilliker, Minneapolis; O. A. Nordquist, St. Paul.

Seedling Chrysanthemums—E. Nagel, Minneapolis.

The Changing Fashions in Cut Flowers—F. G. Gould, Excelsior.

Decorative Horticulture for Farmers—Wm. Toole, Baraboo, Wis.

THURSDAY MORNING SESSION—9 o'clock.

General Subject—Fruit List, Vegetables and Pantry Stores.

Prayer.

Report of committee on fruit list.

Report of committee on vegetables—W. G. Beardsley, St. Louis Park; George
Jehu, Hastings; J. A. Sampson, Excelsior.

Potato Culture—B. T. Wilcox, Hastings.

Fungicides Applied to Potatoes—Prof. S. B. Green, St. Anthony Park.

Tomato Culture in the Market Garden—J. A. Sampson, Excelsior.

Growing Vegetables for Shipment—L. H. Wilcox, Hastings.

Report of committee on cooking and pantry stores—Mrs. E. Cross, Sauk Rapids;
Mrs. Annie Bonniwell, Hutchinson.

Feeding the Family—C. L. Smith, Minneapolis.

Report of horticultural exhibit at Minneapolis Exposition—R. S. Mackintosh Langdon.

Report of committee on award of premiums.

Announce election for the afternoon and renewal of membership. Annual fee, \$1.00. Life membership fee, \$10.00.

THURSDAY AFTERNOON SESSION—2 o'clock.

General Subject—World's Fair, Annual Election and Reports of Delegates.

American Pomology at the World's Fair—J. S. Harris, La Crescent.

Report of the Minnesota Horticultural Exhibit at the Columbian Exposition—A. W. Latham, superintendent.

Report of World's Fair committee—J. M. Underwood, Lake City; W. Elliot, Minneapolis; Prof. S. B. Green, St. Anthony Park.

Minnesota Horticulture at the World's Fair—C. McC. Reeve, secretary Minnesota World's Fair Commission, Minneapolis.

Annual report of the executive committee.

Annual election of officers.

Report of committee on life membership—O. F. Brand, Faribault; Ditus Day Farmington; A. W. Latham, Minneapolis.

Report of committee on president's address.

Report of delegate to Northern Iowa Horticultural Society—S. D. Richardson, Winnebago City.

Report of delegate to Iowa State Horticultural Society—J. S. Harris, La Crescent.

Report of delegate to Wisconsin State Horticultural Society.

THURSDAY EVENING SESSION—7:30 o'clock.

General Subject—Forestry.

The lumbermen of the Northwest are especially invited to attend this session and take part in the discussion of this subject.

Address of welcome—Col. J. H. Stevens, president Minnesota Forestry Association.

Report of committee on forestry—Clarence Wedge, Albert Lea; L. R. Moyer, Montevideo; M. Cutler, Sumter.

Report of committee on evergreens—A. Terry, Slayton; R. C. Keel, Rochester.

Evergreens for Shelter—Miss Gertrude Ellis, Austin.

Forest Education and Administration in Europe—N. F. Brand, Faribault.

Other papers will be presented by well known authorities on forestry.

FRIDAY MORNING SESSION—9 o'clock.

General Subject—Bee-Keeping.

Prayer.

Adulteration of Honey—J. P. West, Hastings, president Bee-Keepers Association.

Report of committee on apiculture—J. W. Murray, Excelsior; Barnett Taylor, Forestville.

Increasing the White Honey Crop and Finding a Market for it—Barnett Taylor, Forestville.

The Advantage of the Honey Bee to Horticulture—Wm. Urie, Minneapolis.

FRIDAY AFTERNOON SESSION—2 o'clock.

General Subject—Entomology and Ornithology.

Report of committee on entomology—J. S. Harris, La Crescent; Prof. S. B. Green, St. Anthony Park.

The Enemies of Our Native Plum—Prof. Otto Luggner, State Entomologist, St. Anthony Park.

Report of committee on ornithology—Mrs. Louise Sampson, 211th St. S., Minneapolis; Frank I. Harris, La Crescent; Frank Shepard, Hastings.

Bird Study—Mrs. Louise Samson, Minneapolis.

Report of committees on obituaries and on final resolutions.

Unfinished business.

Five o'clock. Adjournment *sine die*.

PREMIUM LIST.

All exhibits must be entered with the secretary and in place by 2 P. M. of the first day of the meeting to be entitled to compete for premiums.

Exhibitors competing must be members of this society and the growers or makers of the articles exhibited. The fruits, flowers and vegetables exhibited must have been grown in Minnesota.

Each exhibit of fruit or vegetables must consist of five specimens, except when otherwise noted.

No premium will be awarded on unworthy exhibits.

APPLES.

	1st Prem.	2d Prem.
Collection.... 3d prem., \$3.00.....	\$8.00	\$5.00
Each variety exhibited.....	1.00	.50
Seedling apple, never before exhibited.....	5.00	3.00

GRAPES.

Collection.....	5.00	3.00
Each variety exhibited.....	1.00	.50

CRANBERRIES.

Collection..	3.00	2.00
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PLANTS IN POTS.

Collection of ornamental and flowering plants.....	5.00	3.00
Single rose in bloom.....	1.00	.50
Single geranium in bloom.....	1.00	.50
Single begonia in bloom.....	1.00	.50
Single carnation in bloom.....	1.00	.50
Single orchid in bloom.....	1.00	.50

CUT FLOWERS.

Floral design.....	5.00	3.00
Collection of roses.....	2.00	1.00
Collection of carnations.....	2.00	1.00
Table bouquet.....	2.00	1.00
Basket of flowers.....	2.00	1.00

VEGETABLES.

Collection—not less than ten kinds.....	5.00	3.00
Early potatoes, single variety.....	1.00	.50
Late potatoes, single variety.....	1.00	.50
Onions, single variety.....	1.00	.50
Turnips, single variety.....	1.00	.50
Beets, single variety.....	1.00	.50
Parsnips, single variety.....	1.00	.50
Carrots, single variety.....	1.00	.50
Celery, single variety.....	1.00	.50
Hubbard squash (one specimen).....	1.00	.50
Cabbage (one specimen), single variety.....	1.00	.50
Cauliflower (one specimen), single variety.....	1.00	.50

PANTRY STORES—PRODUCT OF 1893.

Collection of canned fruits.....	2.00	1.00
Collection of jellies.....	2.00	1.00
Collection of pickles.....	2.00	1.00

HONEY.

Collection of comb honey.....	5.00	3.00
Collection of extracted honey.....	3.00	2.00

Dealers in horticultural implements and appliances are invited to place them on exhibition.

FIRST DAY.

MORNING SESSION, TUESDAY, January 9, 1894.

The annual meeting of the Minnesota State Horticultural Society was called to order by President J. M. Underwood.

Rev. H. W. Gleason, editor of the "Northwestern Congregationalist," offered prayer, after which Pres. Underwood addressed the society in the following words:

Members of State Horticultural Society.—I am pleased to meet here with you this morning and see so many familiar faces, and also to see some faces here that are not so familiar to me, but with whom I hope we shall become well acquainted. I trust in our deliberations here in the next few days that each person that comes into this room will feel that he has a personal work in contributing to the pleasure and success of our meeting, and that each one of us is to consider, what can I do, what can each one of us do, to add to the pleasures of our meetings? and if we each take up this work in that spirit, I am sure we will have a very interesting time. Now, as the time passes, I hope you will be careful to note anything in the line of horticultural experience that you wish to have brought out; and if you have any thought that will help any one in this line, remember that our proceedings are published and that they go to all parts of the state, and a great many places out of the state, where that thought will have its effect and produce a good result in helping some one to do something better than he has been doing heretofore, or that will bring out a discovery on some subject which will give us light and make the way clear for us; and so you will help to make our society productive of great good. Anything that gives me something to do is always a pleasure, and all the work you can put upon me in this horticultural society, I am always glad to take up and do my best. Let us all have that same spirit and feeling and see how many we can interest in this work. You can invite your friends in the city to come in and fill up our ranks, and we will try and interest them, and to make amends for those who cannot be here. It seems to be impossible for us to secure reductions of rates from the railroads, and it seems a little difficult to get people who have to come here fifty to hundred miles or more to attend our meetings, but we can make that loss up largely if our friends in this city will come in and show their good will by giving us their assistance.

Pres. Underwood: I will appoint as members of committee on credentials: Messrs. J. S. Harris, S. D. Richardson and L. R. Moyer.

The first on our program is the report of the committee on small fruits, and as Mr. Cook is not present, I will ask the secretary to read his report.

"Report of Committee on Small Fruits," by M. W. Cook, Rochester. (*See index.*)

The following report was then read: "Report on Small Fruits," E. E. Harris, La Crescent. (*See index.*)

A discussion followed the reading of these two reports.

Mr. Harris: I wish to present the credentials of Prof. N. E. Hansen, of the Iowa Society, and I move that his credentials be accepted, and that he be made an honorary member of our society for one year. Carried.

The "Report on Small Fruits," by Wm. Robinson, Hastings, was then read. (*See index.*) A short discussion followed.

The secretary next read the following paper:

"Suggestions on Small Fruit Culture," by M. W. Cook, Rochester. (See *index*.) This was followed by a warm discussion.

President Underwood: We have a paper here from Mr. Kellogg, of Janesville, Wis., which is on the same line of thought we have taken, and I will ask the secretary to read it.

The secretary then read "New Strawberries," by G. J. Kellogg, Janesville, Wis. (See *index*.)

President Underwood: The next is a paper on "The Profits of Small Fruit Culture," by Mr. C. W. Sampson, of Excelsior. Mr. Sampson then read his paper. (See *index*.)

A general discussion ensued.

The society then adjourned to 2 P. M.

AFTERNOON SESSION, TUESDAY, January 9, 1894.

The afternoon session was called to order by President Underwood at two o'clock, and the first item on the program taken up was the report of the committee on plums and cherries.

The following report was read by the secretary:

"Report of Committee on Plums and Cherries," by Jos. Wood-Window. (See *index*.)

This was followed by the report of H. Knudson, Springfield, on the same subject. (See *index*.)

Prof. N. E. Hansen, of Ames, Ia., Agricultural College, then read the following paper: "The Sand Cherry as a Stock for the Plum and Cherry." (See *index*.)

The secretary then read "Native Plums and Their Development," by O. M. Lord, Minnesota City. (See *index*.)

A long discussion followed on the general subject of plums.

Prof. S. B. Green then read the following paper, which, although not on the program, had a direct bearing on the subject under discussion: "Cross-Fertilization of Grapes." (See *index*.)

Mr. Harris: The committee on credentials would report that Mr. Z. K. Jewett, of Sparta, Wisconsin, is present, and I move you that he be accepted as a delegate from the Wisconsin Society and invited to participate in our deliberations, and that he be made an honorary member of our society for one year. Motion seconded and carried.

Pres. Underwood: Mr. Jewett, we welcome you to our number.

Mr. Jewett: Mr. President, I thank you for your kindness, and will say that I am much entertained and will do all I can to help you.

Prof. S. B. Green then read the following paper:

"Conservation of Moisture in the Soil." (See *index*.) A brief discussion ensued.

The secretary then read the following papers: "Irrigation for Minnesota," by Hon. S. M. Emery, Bozeman, Mont. (See *index*.)

"Irrigation Applied to Minnesota," by A. W. Sias, Pueblo, Col. (See *index*.)

The following committees were appointed by the president:

Presidents address—W. Elliot, L. R. Moyer, Dr. M. M. Frisselle.

Fruit list—Clarence Wedge, F. G. Gould, John P. Andrews, S. D. Richardson, E. H. S. Dartt.

Obit uaries—J. S. Harris, O. F. Brand, Col. J. H. Stevens.

Final resolutions—W. R. Dobbyn, C. L. Smith, C. W. Sampson.

EVENING SESSION, TUESDAY, January 9, 1894.

President Underwood called the meeting to order at 8:00 o'clock, and introduced the program in the following words:

Ladies and Gentlemen: The first thing on our program is the address of welcome by Mayor Wm. H. Eustis, of Minneapolis. Most of you are familiar with his face and fame. I beg to introduce to you the Mayor of Minneapolis:

Mayor Wm. H. Eustis then stepped forward and in a few well chosen words welcomed the society to the hospitality of the city, to which Prof. W. W. Pendergast responded briefly on the part of the society in his usual happy vein.

President Underwood then delivered his annual address as follows:

Members of the Minnesota State Horticultural Society.—As in the life of the farmer threshing succeeds the harvest, so it is with us that after the year's experiences we come bringing our sheaves to the threshing floor of the State Horticultural Society, where we can winnow the results of the year and select the seed that we shall plant in 1894.

I congratulate the members of our fraternity that we have not been directly affected by the financial and economic disturbances that have oppressed the commercial and political atmosphere. Politicians are clashing in combat over the silver question, the tariff, and taxation. Our daily papers are burdened with accounts of failures; a continual wail over the low price of wheat and the stagnation of business, that has thrown thousands of men out of employment; of the charities bestowed upon them, the studied schemes to give them work and food to keep them from starvation, until we turn, faint and heart-sick by their perusal, to a good, fresh, breezy horticultural journal that tells us only of our beloved trees and plants, our fruits and flowers, that cheer and gladden, too. It is amusing to hear some pessimistic persons pitying the condition of the farmers and shouting about hard times, the low price of wheat, hogs, cattle, etc., while the horticulturist sells his garden truck, his fruits and flowers, and lives contented on what he grows. I am not one, however, who thinks the farmer a man to be pitied, and men who do think so need not waste their sympathy. From intimate relations with the farmers, I know they are most prosperous, happy, and independent people on earth. They raise on their own farms nearly all they need. Their houses are warm and comfortable, their barns are commodious and well filled, and as they come into intimate relation with our horticultural society and learn to surround their homes with fruit and flowers, they round out their lives and make them like our Minnesota weather—a perpetual sunshine. It is amusing to the country folk to listen to the utterance of some of their city friends afflicted with enteralgia over the terrible condition of their poor country relations. Well, they need not worry a bit. Not only are the farmers well fixed at home, but the bank safes are well filled with their deposits.

Last summer when confidence in banks was shaken, what caused the bank failures and stringency in the money market? Why, the poor farmer simply took his money home with him. Where is it now? He is using it to fix up his home, and as his confidence is restored he will go back to the bank again, and just so far as banks will guarantee that he can have his money when wants it, just so long will he leave it for them to use. I cannot see as there is any less money in the country than there was a year ago. Even bank reports make a good showing. Banks of \$50,000 capital show deposits of over \$200,000, and an October report of one of the Minneapolis banks with \$500,000 capital, show \$750,000 deposits as against \$550,000 last May—and our well-to-do farmers and horticulturists are behind

it all. They have learned the lesson of *economy*. That, more than anything else, will make a man independent.

There is a class of people, however, that need attention. They flock to the towns and cities and for more than half the year are unemployed. When they do work, they demand unreasonable wages and spend their money as fast as earned; they are not much more responsible for what they do than the Indians are. The general government should colonize them in each state, give them ten acres of land and a small comfortable house to use, which they could buy as they were able; surround them with schools, a house for worship, factories, mills and all things necessary to live within themselves; place instructors over them and compel them to learn to be self-supporting. How much happier the poor would be surrounded by fruits and flowers and vegetables of their own growing than they now are living on the charities of the town! Ten acres is enough for any man's happiness.

In a recent "Littell" I read a lovely article, entitled "The Garden that I Love." One feature represented the garden of a *mechanic*. It said, "It was a little plot of ground some fifteen feet square. Its main ornament was a giant echeveria, certainly not by reason of its loveliness, but rather by the heartiness of its growth, somewhat surprising in a comparatively tender species exposed to all the chances of the year. Around it, at carefully calculated distances, were geraniums, calceolarias, ageratums and some ten-week stocks; everything, in fact, that you have a right to look for in a highly respectable enclosure. The man was a *mechanic*, employed in some neighboring railway works, and he evidently treated his spare little plot like a machine which ought never to be out of gear. He had cast aside the dress of his daily occupation, smartened himself up and put on his best attire, as he always did when about to work among his flowers, as though the tidiness he exacted from them reacted upon himself and compelled him, in turn, to be spick and span when in their superior company. I had stopped to compliment him on the assiduity with which he cultivated his bit of ground and for friendliness sake observed that he must indeed be fond of it. Then came the emphatic answer, "*I could live in it.*" Could live in a garden fifteen feet square! There lies the key of success.

How much can we make a given amount of land produce, not how many acres can we grasp and carelessly run over: Not how *much* we can do, but how *well*, will bring us contentment and joy. And so, as we turn to look upon the experiences of the past year, we are in a frame of mind to resolve that in 1894 we will not err in doing our work well.

The winter of 1892-3 was very severe, and we had reason to expect more serious results than we experienced. If we have not realized the full measure of returns in some things, we have more than realized it in others. Strawberries, raspberries and blackberries were a bountiful crop in most parts of the state, although drought in some places shortened the season of fruiting. Grapes were abundant and delicious. The season was particularly favorable, so that late ripening varieties became sweet and palatable. Plums, also, were a good crop and were only limited by the inability of the trees to support the fruit. In apples we shared in the general disaster of nearly every state, but our gardens blessed us with their generous returns of all kinds of vegetables. Our cellars are full, not excepting the golden pumpkin for pies. From the early spring anemone to the late asters and golden rod of autumn, our eyes were gladdened by the sight, and the air was laden by the perfume of beautiful flowers of all kinds.

The great Columbian Exposition has, of course, been the event of our lives. Every one that went is glad of it and loud in praise, and, yet, no one can feel satisfied. It was too vast to comprehend. Our horticultural interests were admirably cared for, and it proved that we did not make a mistake in recommending our worthy secretary,

Mr. Latham, as superintendent. If we did not have the largest, we did have one of the most unique and best kept displays there. In conversation with Mr. Augustine, of Illinois, who was superintendent of the Illinois exhibit, he complimented the Minnesota exhibit very highly and called my attention to the fact that they had copied our display in installing theirs. As I look back on the whole grand scene, I am impressed by the thought of what a great advantage to horticulture it would be if at some future time we could have a reproduction of the horticultural part, and nothing else to occupy our time and attention. We could then more thoroughly see and learn all that the great branch of horticulture contained for us.

The interests of our society have been well maintained the last year, and although our membership is a trifle larger than it has been, it does not increase as it should. The premiums given were the means of adding sixty-one new names, but the plan was not matured early enough to advertise it as it deserved. I think it would be well to continue the giving of premiums and to take more decided steps for the formation of local societies. We ought to bring all classes of farmers into more intimate touch with the best thoughts in advanced horticulture. I would suggest that we issue a blank form of organization that can be adopted by local societies, providing for semi-monthly meetings. They could be held at some farm house, and there should be one in every school district in the state. Topics for discussion should be given them and their work outlined so it would be interesting, amusing and instructive. A course of horticultural reading should be outlined and blank forms of reports provided that could be filled out and mailed to our secretary at the close of the winter term of school. To inaugurate this plan, I would have the secretary mail the necessary blanks and instructions to the teacher in each school district, and ask their co-operation by requesting the parents to meet some evening and outline the plan to them and urge its adoption.

If this can be done at once, I feel certain it will give an impetus to the growth of our society that will be most gratifying and do a great amount of good. I am pleased to know that a local society has been formed in Freeborn and Mower counties. It reflects great credit on our members, who have taken the work in hand. If our secretary could send out a lecturer to address local societies, it would help and add greatly to their success. No doubt, many of our members would gladly address societies that wished them, and our secretary could arrange the matter, if application was made to him.

A most excellent work is being done by the Farmers Institute, under the very efficient management of Mr. O. C. Gregg; and it clearly demonstrates what may be accomplished by intelligent organization and proper application of work; but the several branches that the institute work embraces makes it impossible to secure to us the auxiliary societies of which I have spoken, or to thoroughly reach all sections of the state. Our society is indebted to Prof. S. B. Green for his able care of the Experiment Station, and our state is sure to reap a rich reward for the work done by the State School of Agriculture and Horticulture at St. Anthony Park.

Your attention is called to a defect in the work of our committees. There should be printed instructions given each committee, defining the nature of their work and their report to the society.

One thing that handicaps our society is the indisposition of the railroads to give us reduced rates. Last year they required us to present at one time one hundred receipts for full fare paid one way to secure a return at one-third fare. This year the number is increased to two hundred and fifty. Our members are coming and going during the four days of our session, while some travel on mileage, so that it is impossible to secure the reduced rate. Many of our members are living comfortably by being economical, and they cannot afford the expense consequent upon a trip to Minneapolis. The same is true of other associations, the Bee-Keepers, the

Forestry, the Dairymen's, the Agricultural and others that help to build up the country and furnish freight and express for the railroads to carry. Let concerted action be taken by all these interests and the case properly presented to the Western Traffic Association, and they will, no doubt, see the justice of granting reduced rates, as they formerly did, by simply requiring the secretary to sign a certificate of attendance.

The effective work being done by the Forestry Association calls for our continued support. We cannot say or do too much for the preservation of our forests and the growth of our timber. Not until every home has at least a good shelter belt of evergreens should we relax our efforts.

In the publication of our society reports there seems to be a chance to inaugurate the printing of a monthly periodical, that commends itself to my favor. It has been under consideration for for the past year. The secretary in his report will outline the proposed plan, and I heartily urge its favorable consideration and adoption.

In conclusion, we have much to be thankful for. Our lives are those of pleasure, full of active, aggressive interest. If at times discouragements arise, we are certain to overcome them; and when our work is done and we can no longer plant and trim, sow and weed and care for the silent friends we have learned to love so much, may earth receive us, as another has beautifully expressed it:

"Mother, a faithful son we bring thee here
In loving ease to lie beneath thy breast,
Which many a year with loving care he drest.
His was the oldest craft, the simple skill
That Adam plied, ere good was known by ill;
The thistle's song at dawn his spirit tuned;
He set his seed in hope, he grafted, pruned,
Weeded and mowed, and with a true son's care
Wrought thee a mantle of embroidery rare.
The snowdrop and the winter aconite
Came at his call, ere frost had ceased to bite;
He bade his crocus flame, as with a charm;
The nestling violets bloomed, and feared no harm,
Knowing that for their sakes a champion meek
Did bloodless battle with the weather bleak;
But when the wealthier months with largess came
His blazoned beds put heraldry to shame,
And on the summer air such perfume cast,
As Saba or the Spice Isles ne'er surpast.
The birds all loved him, for he would not shoot
Even the winged thieves that stole his fruit;
And he loved them—the little fearless wren,
The red-breast, curious in the ways of men,
The pilgrim swallow, and the dearer guest
That sets beneath our eaves her plastered nest.
The merry white-throat bursting with his song,
Fluttered within his reach and feared no wrong;
And the mute fly-catcher forgot her dread
And took her pay beside his stooping head.
Receive him, Mother Earth, his work is done;
Blameless he lived, and did offense to none,
Blameless he died, forbidding us to throw
Flowers in his grave, because he loved them so;
He would not have them stifle underground,
But bloom among the grasses on his mound.
We that have loved, must leave him: Mother, keep
A faithful watch about him in his sleep."

SECRETARY'S ANNUAL REPORT.

A. W. LATHAM.

Mr. President and Fellow Members of the Minnesota State Horticultural Society:

The twenty-first published report of the transactions of this society, issued during the current year, holds its own as to size, being in fact an increase of ten pages over that of 1892. In editing it I have followed the order of arrangement in the previous volumes that have come from my hand, and classified, as far as possible, the papers and discussions that it contains. The usual number of volumes has been printed, namely, 2,000 cloth and 1,500 paper-bound, and about the same number was distributed as last year.

Membership.

In a general way our society has prospered during the year, though it has, on the whole, been a rather unfortunate one for the practical horticulturist, who has not received, in many cases, the usual reward for his labors. The annual membership numbered 376, as against 296 for the year before, being an increase of 80. The life membership has also been increased by the addition of one honorary and two paid members, with, as far as I can learn, no decrease from their ranks on account of death, the present number of life members being 47. Of honorary members for five years we number on our roll 14, making a present total membership of 437. This record makes the Minnesota society, without doubt, one of the strongest organizations of its kind in America, and places upon it obligations that, we think, the society is in good faith and with reasonable success carrying out.

Offering Premiums.

Of the annual membership sixty-one came as a result of a plan of offering premiums to new members. It was nearly the middle of April when the advertisements connected with these premiums were sent out to the press of the state. It was well advertised gratuitously by a large portion of the papers solicited, the list of which is to be published in the forthcoming report. But on account of the lateness of the season the response was not large, the first one being received April 18th, and most of the others within two or three weeks from that date. The following is a copy of the offer in full:

MINNESOTA PLANTS OFFERED FREE.

The Minnesota State Horticultural Society, to increase its membership to 1,000 during this Columbian year, offers to each new member for 1893 making application directly to the secretary five horticultural premiums worth 25 cents each—total \$1.25.

In addition to the premiums *new members will be entitled to all the privileges of the society*, including a handsome cloth-bound copy of the report of 1893, about 400 pages, sent postpaid, and some of the back reports by express, if desired, while the surplus holds out.

The following is a list of the premiums:

Group One—From the Mendenhall Greenhouses, Minneapolis: Lot 1, two geraniums (assorted); lot 2, four pansies (assorted); lot 3, two daisies and one manettia vine; lot 4, one heliotrope and one tea rose.

Group Two—From Martin W. Cook's Nursery, Rochester: Lot 1, four Stone's Hardy blackberries; lot 2, six Turner red raspberries; lot 3, eight Warfield and four Bederwood strawberries; lot 4, eight Crescent and four Jessie strawberries; lot 5, twelve Warfield strawberries.

Group Three—From L. L. May & Co. Seedsmen, St. Paul (their choice): Lot 1, ten varieties of flower seeds; lot 2, ten varieties of vegetable seeds.

Group Four—From the Jewell Nursery Co., Lake City: Lot 1, two Concord grapes, 1 year; lot 2, ten arbor vitae, 4 to 6 inches; lot 3, fifty seedling ash; lot 4, one Tartarian honeysuckle; lot 5, one American ivy.

Group Five—Lot 1, six months subscription to "Farm, Stock and Home" (new subscribers); lot 2, six months subscription to "Farmers' Minneapolis Tribune."

Mr. J. S. Harris, of La Crescent, offers to each of the first 100 who request it at the time of joining, four new Russian apple trees, 2 to 3 feet high, to be sent by express next fall.

Each new member can select one lot (and one only) from each of the above five groups and notify the secretary by numbers of his choice, *enclosing one dollar*, the annual fee of this society. The lots selected will be sent free postpaid.

Remit and make application to

A. W. LATHAM, Secretary,
Excelsior, Minn.

The plan of offering premiums for members seems to be a practicable one and, if begun earlier in the season, it would, without doubt, yield satisfactory results. It is possible, perhaps, that some arrangement might be made with the experiment station, so that annual premiums, consisting of some new and worthy varieties of fruits and flowers, might be sent to all members. A suggestion looking towards this has been discussed and may, in the future, yield results.

While speaking of this premium matter, I will refer briefly to the plan which was adopted by the executive committee, and which I had the honor of carrying out, of distributing strawberry plants among the children of the state. The following notice was published quite generally in connection with the premium notice:

STRAWBERRY PLANTS FREE FOR THE CHILDREN.

To encourage an interest in horticultural pursuits among the young people of our state the Minnesota State Horticultural Society offers by mail free to the first one thousand Minnesota children under 16 (only one in a family) making written application, six strawberry plants of some good variety.

The applicant must give name, age, post office and county, enclosing 4 cents in stamps to pay for packing and postage, and promise to set and care for the plants according to the directions to be furnished, and to make a report of their condition in September, 1893.

Please write the word "strawberries" in the upper left hand corner of the envelope.

Application must be made to A. W. LATHAM, Secretary, Excelsior, Minn.

The responses numbered 619. The plan being so much in the nature of an experiment and quite different from that adopted by Brother Thayer, of Wisconsin, was not advertised as widely as the premium scheme, but the results were, as far as numbers were concerned, quite satisfactory. Applicants were required to report in September. This part of the plan, certainly, was not much of a success, only five or six out of the 619 making the report. Here is a specimen:

Nov. 15th, 1893.

MR. A. W. LATHAM,

DEAR SIR: I would have written to you when I first got the strawberry plants, if I had not lost your address, as my plants died soon after I got them. They were very dry when I got them; nearly dead I think. Thank you for sending them.

Judging by this letter and a few others from the children, the criticism seems to be that the plants in such small quantities do not arrive in good condition. However, for all we know, the balance who did not report may have succeeded. A modification, providing that the plants be sent in bulk to the teachers of the state and distributed by them under proper conditions, might yield more satisfactory results.

It was my privilege to be present at the summer meeting, held at the experiment station at St. Anthony Park, and the trip which I made from my field of work in your interests at the World's Fair was well repaid by the pleasure of that occasion. Probably seventy-five were present, and the bright day and the genial hospitality of the people at the station made the gathering one to be remembered. To those who have never taken the opportunity to attend the short summer session it is fitting to say that these gatherings are among the most enjoyable of the society. Come and see, and be profited.

I need not say to you that this has been a very unfortunate season for the orchardist and somewhat so for the small fruit grower. In my work at the Fair, I had special opportunity to notice this. If it is true that misery loves company, however, you had plenty of it, for almost the only apples worth anything in the market today are coming in boxes from the Pacific coast and retailing at forty cents a dozen. I think that the discouraging apple crop has something to do with the program this year, as very few of our members have shown a disposition to write on this subject, and there will be no long papers to interfere with the discussion of any phase of it that comes up.

World's Fair.

Much might be said on this subject which properly finds a place in a secretary's report, as a large share of the work in connection with our horticultural exhibit there and its results are intimately connected with the machinery of the society and its membership. In fact, without the existence of the society it would have been practically impossible, at least in such an unfavorable year, to have made a passable exhibit. It was found to be so in the case of some of the state exhibits there which were not supported by such an organization. As my special report on this subject will come before you later, I will not take time now any further than to express most heartily my appreciation of the support given me by the fellow members of the society.

SOUTHERN MINNESOTA SOCIETY.

It is in order to notice the formation of a horticultural society in southern Minnesota, as to the name of which, however, I am not sure, as I understand it is to cover only two or three counties; but they sent out a very handsome printed program under the title of "Southern Minnesota Horticultural Society." An application has come from their president for a quantity of reports for distribution, and they are hopeful, as we are also, that much good will come of this. Perhaps, there are other sections of the state that would be specially benefitted as well by a local organization.

The Library.

Our library will show about the same increase as was made in 1892. No special efforts have been made in this direction, but the usual exchanges and some missing years of reports from various states, with contributions from Messrs. Wyman Elliot J. S. Harris and others, have made the number of additions a very creditable one. I will speak of this further in the librarian's report.

Form of Report.

In conformity with my steady purpose to widen the field of usefulness of the society and in every practicable way extend its work, I have given some thought to the matter of a change in the manner of publishing our annual report, to which I wish to call your attention briefly. The change suggested consists in issuing it in twelve parts, somewhat in the form of a monthly magazine, one part to be sent to each member each month. With our present membership this would take some 450 copies. The balance could be bound at the end of the year, 2,000 in cloth and the rest in paper covers, as at present. Each member upon renewing his membership at the beginning of the following year might be entitled to a cloth-bound copy of the twelve numbers bound in one book, and the monthlies that had been sent out during the year could be distributed to advantage by those who received them.

There are many advantages connected with this form of printing the report, some of which are as follows: The present form of report not being issued until about the first of June fails to bring to you early enough in the season to be a benefit that year much information which you desire. Prior to the first of June, under the proposed arrangement, five monthly issues would have been sent to you, containing in all one-half of the whole report, and so selected, as far as possible, as to give you the matter you most need. It would also be a convenient way of sending out notices and otherwise communicating with members on any subject. Items of local or timely interest to the horticulture of the state could be sent to you without delay. The members could through this channel, in an easy way, communicate their thoughts to the society. The reports of other horticultural meetings and extracts from the bulletins of the experiment stations of the country could be sent at once as fresh material and

As to the disadvantages of such an arrangement, there are none of which I know that, upon reflection, do not cease to be so. I believe such a change would be the means, in our hands, of increasing very largely our membership and the influence of the society for good. The additional expense connected therewith, as far as it is permitted to increase, need not exceed the additional fees received from an increase of membership. I have conferred with the public printer and the gentleman in charge of it, and there seems to be no obstacle in the way of the suggested change. I beg you to give this, as it seems to me, very important subject your earnest consideration.

I have the honor to submit the following financial report for the year:

Receipts from annual membership fees for 1892	\$ 7.00
" " " " 1893	349.00
" " " " 1894	17.00
Life membership fees.....	15.00
Total.....	<u>\$388.00</u>
<i>Disbursements—</i>	
Postage.....	\$137.59
Printing, stationery, etc.....	109.11
Express on reports, etc.....	12.60
Expenses annual meeting, 1893.....	24.95
Library rent, etc.....	19.56
Sundries	12.40
E. A. Cuzner, salary	15.00
Seal for society	6.40
Paid to treasurer	50.39
Total.....	<u>\$388.00</u>

The disbursements, as they appear in this and in my financial report for the preceeding year, do not indicate exactly the comparative expense of administering the secretary's office, as it has been found a convenient method for all concerned for the secretary to pay the current bills of the office directly from the membership fees received, presenting a full detailed bill to the executive committee at the time of the annual meeting to be audited at one time, instead of presenting in detail a large number of small bills. This method of administering the finances meets the approval of the auditing committee, and saves a large amount of work. The only objection to it is that it gives the secretary no opportunity in his report to show that he has paid a large fund into the treasury.

The close of the third year of my service in your behalf is now at hand. It has been a service in every way satisfactory and agreeable to me, and, I trust productive of some good results to you and the interests of the horticulture of our state. While I know that my work has not been free from error, and that certainly many things that I have done might have been better done or even, perhaps, better left undone, yet it is equally certain that my only motive has been in all instances to advance the work you have placed in my hands.

During the past year my duties in connection with the World's Fair have taken me for a large portion of my time away from my immediate duties as secretary. The ordinary routine work of the society during this period has not, I believe, been neglected, and I

have had at all times and in whatever place a thoughtful oversight for the interests of the society; but I have been unable, as it is my desire and my natural disposition to do, to explore new fields in furthering this cause. Whether the results of my work at the Fair have been of as much value to you as though I had been in Minnesota, I leave you to determine, and trust that in this, as well as in all other matters where we are officially connected, you will exercise that kindly charity which is well known to be characteristic of you, both individually and as a society. I have the honor to remain,

Yours very respectfully,

A. W. LATHAM, Sec'y.

TREASURER'S ANNUAL REPORT FOR THE YEAR ENDING JANUARY 9, 1894.

Receipts:

Jan. 12, 1893.	Balance on hand.....	\$143.55
" "	Received from state treas. $\frac{1}{2}$ annual appro...	500.00
July 3, 1893.	Received from state treas. $\frac{1}{2}$ annual appro.....	500.00
Nov. 20, 1893.	Received from A. W. Latham, membership fees	36.00

\$1,179.55

Disbursements.

Jan. 11, 1893.	A. W. Latham, fourth quarter salary as sec'y.	\$125.00
" "	J. M. Underwood, salary as president.....	25.00
" "	Ditus Day, salary as treasurer	25.00
" "	E. A. Cuzner, salary as assistant librarian....	15.00
" "	Mrs. Jennie Stager, expenses as vice-pres.....	4.00
Jan. 13, "	C. W. H. Heideman, exp as delegate.....	22.75
" "	O. F. Brand, exp. to meeting.....	7.19
" "	J. S. Harris, exp. to meeting.....	8.25
" "	J. M. Underwood, fare to meeting.....	2.75

Premiums awarded at the winter meeting of Jan. 1893.

Jan. 13, 1893.	Wm. Somerville.....	\$14.00
" "	R. C. Keel.....	17.00
" "	Mrs. D. A. Gordon.....	.50
" "	Ditus Day.....	4.00
" "	Clarence Wedge.....	7.00
" "	E. D. Ames.....	5.00
" "	Wm. Lyons.....	5.00
" "	Mrs. A. A. Kennedy.....	2.00
" "	M. M. Frisselle.....	2.00
" "	H. L. Crane.....	9.50
" "	A. W. Latham.....	8.50
" "	J. W. Murray.....	2.00
" "	Wm. Urie.....	6.00
" "	J. G. Bass.....	6.00
" "	Mrs. J. W. Blackwell.....	3.00
" "	J. A. Sampson.....	2.00
" "	E. M. Chandler.....	2.50
" "	H. F. Bussee.....	5.00
" "	Joshua Allyn.....	11.50
" "	E. Nagel & Co.....	20.00
" "	P. D. Anderson.....	3.00

135.50

Feb. 15.	L. H. Wilcox, exp. to com. meetings.....	10.00
"	Dewain Cook, vice-president.....	8.46
March 29.	Clarence Wedge, exp. as delegate.....	11.50
April 15.	J. H. Savage, reporting winter meeting.....	99.30
"	A. W. Latham, first quarter salary of 1893.....	150.00

July	Elliot & Metcalf, rent of room for library from March 1st to July 31st.....	25.00
July 6.	A. W. Latham, postage on reports.....	79.90
"	A. W. Latham, second quarter salary.....	150.00
"	O. F. Brand, expenses as ex. com.....	4.14
"	J. S. Harris, expenses as ex. com.....	15.20
Premiums awarded at summer meeting of 1893.		
July 10.	F. G. Gould.....	\$6.00
"	Wm. Mackintosh & Son.....	3.00
"	E. A. Ostergren.....	7.50
"	E. Nagel & Co.....	11.00
"	J. M. Underwood.....	11.00
"	L. E. Day.....	2.00
"	J. R. Cummings.....	3.00
"	Wm. Lyons.....	8.50
"	Wm. Danforth.....	7.00
"	Mrs. Fidelia Allyn.....	3.00
		62.00
Nov. 3.	Elliot & Metcalf, rent of room for library from August 1st to November 30.....	20.00
Nov. 20.	A. W. Latham, third quarter salary.....	150.00
		\$1,155.94
Balance.....		23.61
		\$1,179.55

All of which is respectfully submitted,

DITUS DAY, Treasurer

LIBRARIAN'S REPORT.

A. W. LATHAM, LIBRARIAN.

I have the honor to report the addition of the following volumes to the library during the past year:

Insects and Insecticides, Annals of Horticulture, 1889, 1890, 1891, Horticulturists' Rule Book, and The Nursery Book, presented by Wyman Elliot. Report Secretary of Agriculture, 1891; Report Agricultural Experiment Station, University of Wisconsin, and Report American Pomological Association, 1891, presented by J. S. Harris. Reports California Agricultural Society, 1870-71, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1882, 1884, 1885, 1887, 1888, 1889, 1890, 1891. Reports Nova Scotia Fruit Growers Association, 1883, 1884, 1885, 1886, 1887, 1888-89, 1890. Report Ohio State Horticultural Society, 1880-81. Report Flora of Peoria, 1887. Report Wisconsin Farm Institutes, 1892. Report Wisconsin State Agricultural Society, 1892, presented by J. S. Harris. Report Illinois State Horticultural Society, 1893. Annual Report Vermont Experiment Station, 1891. Report New Jersey State Horticultural Society, 1892. Report Minneapolis Park Commissioners, 1892. Report Pennsylvania State Agricultural College, 1891. Report Oregon Board of Horticulture, 1891. Report Wyoming Agricultural College, 1892. Climatology of North Carolina, 1820 to 1892. The Metaspermæ of the Minnesota Valley and Report Minnesota State Zoologist, presented by the author. Report Western New York Horticultural Society, 1893. Reports Michigan State Horticultural Society, 1883, 1887, 1888, 1890, 1891. Report Washington State Board of Horticulture, 1893. Report Maine State Pomological Society, 1892. Report Indiana State Horticultural Society, 1892. Report Ontario Fruit Growers Association, 1892. Report Iowa State Horticultural Society, 1892. Report Ohio State Horticultural Society, 1892-93; Report Wisconsin State Horticultural Society, 1893. In all, sixty volumes.

No special effort has been made this year to increase the contents of the library, but it would seem that some work could be still done in this direction that would yield good results. An effort will be made to secure the bulletins as they are being issued now by a number of the different experiment stations in the country, and to get them in good shape for future use, it might be well to incur the expense of binding.

There are many files of reports in our library that are still incomplete. Many of these can, probably, be secured, but it will require some time and considerable work in the nature of correspondence.

Sufficient material has now been gathered to give our library the appearance of permanence, and the more hopeful of our number are looking forward to the time when we shall have a permanent location for this purpose and other uses of the society.

An ideal library should be central and easily accessible; should have a comfortable reading room, where files of all the prominent horticultural periodicals of the country might be kept; and every new publication of importance to our work should early be found on its shelves. Our annual or monthly report, as the case may be, should send out the cream of all this collection. In short, this library should be the center of collection and distribution of all the live horticultural knowledge of the day. How near can we approximate to this desirable result?

A suggestion was made last year in regard to providing glass fronts to the bookcases. This has not yet been done, and being a matter of small expense, it should not long be neglected.

ASSISTANT LIBRARIAN'S REPORT.

E. A. CUZNER, Asst. Librarian.

List of Minnesota State Horticultural Society reports stored in the Pillsbury Hall, State University, Minneapolis, Dec. 20, 1893:

		Paper.	Cloth.
For the year	1876.....	218	...
" "	" 1877.....	10	...
" "	" 1887.....	800	...
" "	" 1882.....	...	52
" "	" 1882.....	412	...
" "	" 1883.....	...	350
" "	" 1884.....	225	...
" "	" 1885.....	375	...
" "	" 1886.....	145	...
" "	" 1887.....	15	{ very
" "	" 1888.....	69	{ poor
" "	" 1889.....	66	...
" "	" 1890.....	324	...
" "	" 1891.....	...	115
" "	" 1891.....	25	...
" "	" 1892.....	...	475
" "	" 1892.....	950	...
" "	" 1893.....	...	475
" "	" 1893.....	510	...

Taken from the reserve (3) three of '75 and one each of the following: '66, '74, '78, '80.

There have been sent out during the year up to Dec. 20, 1893, 373 copies of the reports to some 83 or 84 different addresses.

P. S.—There are also 87 copies of 1893 wrapped ready for mailing.

REPORT OF COMMITTEE ON LIBRARY.

J. S. HARRIS.

We have collected publications for the library of the State Horticultural Society during the year 1893 as follows:

Bound in cloth—

Statistics of Agriculture, tenth census of U. S.
Report of the Secretary of Agriculture, 1892.

In pamphlets—

An Agricultural Survey of Wyoming.
The Russian Thistle and other Troublesome Weeds.
Record of Experiments with Sorghum in 1892.
Record of Experiments with Sugar Beets in 1892.
The Most Destructive Locusts of America, North of Mexico.
Rice, its Cultivation, Production and Distribution.
Report upon Numbers and Values of Farm Animals.
Production and Distribution of the Principal Agricultural Products of the World.
Report on Distribution and Consumption of Corn and Wheat.
Report upon Investigations Relating to Treatment of Lumpy Jaw.
Nostrums for Increasing the Yield of Butter.
The Prairie Ground Squirrels.
Report of the Secretary of Agriculture for 1893.
Foods and Food Adulterants.
Forest Influences, Bulletin No. 7.
Report of Chief of Bureau of Forestry.
Report on the Crops of the Year 1892.
Reports of Statistician of the U. S. Department of Agriculture, eleven numbers.

(The above have been deposited in the library.)

Prof. Wm. R. Dobbryn, editor of the "Progressive Age," then delivered an eloquent and interesting address on the subject: "*The Horticulturist as a Reformer.*"

Pres. Underwood: The next subject on our program is "Wind," and who in our society can so ably bring out and develop this subject as our friend E. H. S. Dartt, of Owatonna? I take pleasure in introducing Mr. Dartt:

Mr. Dartt. Mr. Chairman, I do not know who can, unless it is the last speaker. I did not much expect to come in after such a speech as that, and I am a little in doubt whether I have the right. Now meat eaters and horticulturists, he does not seem to connect very closely. I am a meat eater, and I think I have a majority on my side. My idea in regard to meat eating is about as I expressed it on a card I once wrote for a school boy. I used to teach school; don't know that I was fit, but did. The card read thus:

"The lion and the lamb are opposites, 'tis true,
Both natures form man, so let them blend in you."

Now, from the paper I am going to read he will say it is clearly caused by meat eating propensities; I think it is, because it is somewhat personal, and I would like to make it personal all round, but I did not have time to hit every one of you, though I have hit a few. Then I have a class on "professors," and I would like to have you all consider yourselves in that when I get to the class of "professors." (Laughter).

Mr. Dartt then read a very entertaining paper on "Wind," E. H. S. Dartt, Owatonna. (See *index*).

Prof. C. W. Hall, of the State University, then delivered a very interesting and instructive lecture on "*Climatic Changes Minnesota*." (It is to be regretted that on account of the want of needed charts this cannot be reproduced here).

The meeting was then adjourned until 9 o'clock, Wednesday.

SECOND DAY.

MORNING SESSION, WEDNESDAY, January 10, 1894.

The meeting was called to order promptly at 9 o'clock by President Underwood, and was opened with prayer by Clarence Wedge of Albert Lea.

The first matter on the program was the report of the committee on apples. Reports were read by Secretary Latham from W. S. Widmoyer, Dresbach, (*See index*) and W. L. Parker, Farmington. (*See index*.)

Following these reports, Mr. S. D. Richardson presented a short but very interesting paper on the subject of "Laying Out an Orchard." (*See index*.)

A long and interesting discussion followed.

Mr. J. S. Harris: Mr. Chairman, Mr. C. Patten from Iowa, and Mr. Wm. Toole from Wisconsin are with us, and I would like to have them recognized as delegates. I move you that they be invited to participate in our deliberations and that they be made honorary members for one year.

The motion was seconded, and on being put to a vote was carried.

Next on the program was the report of the committee on seedling fruits, presented by Mr. J. S. Harris, La Crescent. (*See index*.)

Col. J. H. Stevens: Mr. President, I move that the committee on seedling fruits be continued another year, and in making that motion I would like very much if they would travel through a portion of the country out in Houston county, or throughout that section. I know of several new seedlings in Carver county of great merit, also in Sibley, and one in Le Sueur, and the society is abundantly able to pay the expenses of this commission; and in thus making the rounds they will probably gather up new seedlings that are worth more than anything we have received yet; and I would include in my motion that the expenses of the commission be paid by the society.

The motion was seconded by Mr. D. F. Akin and carried.

AFTERNOON SESSION, WEDNESDAY, January 10, 1894.

The meeting was called to order at 2 o'clock by President Underwood, and the deferred program of the morning session was taken up, calling for the reports of committees on general fruits from the various congressional districts of the state.

Mr. C. Theilmann, of Theilmanton, from the first cong. district read his report. (*See index*.)

This was followed by the report of Mr. R. C. Keel, of Rochester, representing the same district. (*See index*.) Some discussion followed this.

The next report was submitted by Mr. D. F. Akin, Farmington, from the third congressional district. (*See index.*)

This was followed by reports from M. C. Bunnell, Newport, and J. G. Bass, Hamline, from the fourth congressional district. (*See index.*)

H. L. Crane, Excelsior, and D. V. Plants, Long Lake, of the fifth congressional district, also presented reports. (*See index.*)

An interesting discussion followed the reading of these reports.

Following this a paper was read on the subject of "My Endeavors to Raise Fruit," by D. F. Akin, Farmington. (*See index.*) Here ensued a short discussion.

The next subject on the program was a paper by Mr. Dartt: "What Fruit can Farmers Most Profitably Grow?" E. H. S. Dartt, Owatonna. (*See index.*) This was well discussed.

The next matter presented was the report of the committee on nomenclature and catalogue, by Prof. S. B. Green, of St. Anthony Park. (*See index.*)

The report of committee on fruit blossoms was read by Mr. O. F. Brand, of Faribault. (*See index.*)

The report of the superintendents of the various experiment stations were submitted through Prof. S. B. Green, St. Anthony Park, superintendent of the central station. (*See index.*)

Mr. E. H. S. Dartt, of Owatonna, presented a separate report of the work at the Owatonna station. (*See index.*) A discussion ensued.

The next matter on the program was the reports of the vice presidents of the society representing the various congressional districts of the state.

The first report submitted was by Clarence Wedge, Albert Lea, of the first congressional district. (*See index.*)

This was followed by the report of S. D. Richardson, Winnebago City, of the second congressional district. (*See index.*) A short discussion followed.

Mr. J. O. Barrett, Browns Valley, representing the seventh congressional District, then submitted his report. (*See index.*)

This being the completion of the afternoon's program, the society adjourned to 7 o'clock p. m.

EVENING SESSION, WEDNESDAY, January 10, 1894.

The meeting was called to order by President Underwood at 8 o'clock. The general subject for the evening was Floriculture, and the first item on the program was the report of the committee on deciduous trees and plants. Secretary Latham read a report from Dr. J. R. Walker, Loomis, Wash. (*See index.*)

The next subject was "Our Native Shrubs and Vines for Ornamental Planting," by C. L. Smith, Minneapolis. (*See index.*) An interesting discussion ensued.

The next subject on the program was a paper on the subject of "Decorative Horticulture for Farmers," by Wm. Toole, Baraboo, Wis. (*See index.*)

Mr. E. Nagel, Minneapolis, then followed with a paper on the subject of "Seedling Crysanthemums." (*See index.*)

"The Changing Fashion in Cut Flowers," was the subject of a short talk by Mr. F. G. Gould, Excelsior. (*See index.*)

President Underwood then read a very interesting paper on the subject of "Plant Rooms in the House," written by himself. (*See index.*)

This concluding the program for the evening, the society adjourned to Thursday morning, 9 o'clock.

MORNING SESSION, THURSDAY, January 11, 1894.

The society was called to order by President Underwood at 9 o'clock and opened with prayer by Mr. J. A. Sampson, of Excelsior.

President Underwood being obliged to attend a committee meeting, called Vice-President Wedge to the chair to preside until his return.

The first matter on the program to be taken up was the report of the committee on vegetables, the first report submitted being by Mr. W. G. Beardsley, St. Louis Park, who made a verbal report. (*See index.*) A brief discussion followed.

The next report on the subject of vegetables was by Mr. J. A. Sampson, Excelsior. (*See index.*) This was also discussed.

The next topic taken up was "Tomato Culture in the Market Garden," by J. A. Sampson, Excelsior. (*See index.*) An interesting discussion followed.

"Fungicides Applied to Potatoes," by Prof. S. B. Green, St. Anthony Park, followed. (*See index.*)

This subject was followed by a paper on "Late Blight and Rot of Potatoes," also by Prof. S. B. Green. (*See index.*) This was also discussed.

The next topic on the program was "Potato Culture," by B. T. Wilcox, Hastings. (*See index.*)

This was followed by a paper on "Growing Vegetables for Shipment," by L. H. Wilcox, Hastings. (*See index.*)

The report of the committee on cooking and pantry stores, by Mrs. Annie Bonniwell, Hutchinson, was next read. (*See index.*)

This completing the program for the forenoon, the society adjourned to meet at 2 o'clock P. M.

AFTERNOON SESSION, THURSDAY, January 11, 1894.

The meeting was called to order by President Underwood, and the first topic taken up on the program was a paper on "American Pomology at the World's Fair," by J. S. Harris, La Crescent. (*See index.*)

At this point Col. J. H. Stevens president of the Minnesota Forestry Association, introduced Mr. O. S. Whitmore, editor of "Hardwood," who made a few remarks and was formally welcomed by the president.

Alderman J. S. Gray: About three weeks ago the sealer of weights and measures introduced a resolution in the city council to create an ordinance regulating the measure in selling berries in this city. I will read a few extracts that you may get the gist of the matter:

AN ORDINANCE PROVIDING A STANDARD MEASURE, ETC.

"SECTION 1. The standard measure by which berries, small fruits, peas and beans and all kinds of nuts shall be sold by measure in the city of Minneapolis shall be that commonly known as dry measure, and the quart shall be one thirty-second part of the United States standard bushel.

"SEC. 2. It shall be unlawful for any person or persons to sell in the city of Minneapolis any berries, small fruits, peas, beans or nuts by any measure other than that commonly known as dry measure, and of the standard as established by this ordinance.

"SEC. 3. *Provided*, That square boxes four and one-half inches in length and breadth, and three and five-sixteenth inches in depth may be used and shall be deemed sufficient to contain one quart when sales are made by the single quart; and in like manner square boxes three and one-fourth inches in length and breadth and three and three-sixteenths inches in depth may be used and shall be deemed a sufficient measure for one pint.

"SEC. 4. After the expiration of one month from the publication of this Ordinance, it shall not be lawful to sell or expose for sale within the city of Minneapolis any berries of small fruits in boxes, except the boxes described in section three (3) of this Ordinance, unless such boxes shall be sealed by the City Sealer of Weights and Measures and the contents of such boxes plainly marked thereon."

On motion of Ald. Gray the matter was referred to a special committee of five, with instructions to report back to the society.

President Underwood appointed as members of that committee Messrs. Gray, J. A. Sampson, Brackett, Lyons and Frisselle.

The deferred report of the committee on fruit list was then taken up and adopted by sections.

The following fruit list for 1894 was adopted: (*See index.*)

At this point, on account of the large attendance, the society adjourned to the rooms of the Stock Exchange, on the first floor of the Lumber Exchange.

The "Report of the Minnesota State Horticultural Exhibit at the Columbian Exposition" was then read by A. W. Latham, superintendent. (*See index.*)

On motion the report was adopted.

Pres. Underwood: I take pleasure in introducing to you the secretary of the Minnesota World's Fair Commission, Col. C. McC. Reeve, of Minneapolis, and I am sure you will be glad to listen to him.

Col. Reeve then addressed the society as follows: (*See index.*)

The executive committee next reported through Wyman Elliot, chairman, as follows:

We find our secretary has done a very excellent work. He has turned in the present year \$411 for members, and we feel that it is due to him that we should sustain him in the good work. We feel that he has been very faithful and efficient in enlarging the work of the society, and that it is due to him largely that the society is in as good shape as it is at present.

The executive committee report as follows: We recommend that the salaries of the officers of the society for the coming year shall be the same as they have been in the past year, namely: President, \$25.00; treasurer, \$25.00; secretary, \$600.00; executive committee shall have their expenses when attending executive committee meetings. We also recommend that there be appropriated one hundred dollars or so much as is necessary to defray the expense of the stenographer in taking the minutes of this meeting and preparing them for publication.

WYMAN ELLIOT, Chairman Ex. Com.

After some discussion, on motion of Col. Stevens the report of the executive committee was laid on the table until the next day, and the election of officers for the ensuing year was proceeded with.

The following officers were elected for 1894. (*See index.*)

The meeting then adjourned.

EVENING SESSION, THURSDAY, January 11, 1894.

The meeting was called to order by Vice-President O. F. Brand.

L. R. Moyer, Montevideo, presented his report as a member of the committee on forestry. (*See index.*)

This was followed by a paper on the subject of "Forest Education and Administration in Europe," by N. F. Brand, Faribault. (*See index.*)

Secretary Latham: Many of our members were present at the meeting held at Mrs. Dorilus Morrison's last winter, where she so splendidly entertained us. At that time a proposition was made looking toward holding a rose fete. A committee was appointed and Mrs. Morrison was made chairman of that committee, and she has sent us a paper on that subject which I will read.

Mrs. Morrison's paper was then read by the secretary.

COMMUNICATION FROM MRS. D. MORRISON.

DEAR MR. LATHAM:—There has been such an uncertain feeling upon my part, owing to our winter plans for leaving the city this month, that it seems more than likely to me I shall be absent from home at the January meeting of the State Horticultural Society.

I regret this extremely, as I should be pleased to be present at the interesting session, to add my word of encouragement and greeting to the members, whom I so pleasantly remember, as well as to listen to the papers and reports, which, I am sure, will be worth hearing.

It occurs to me, that instead of preparing any formal report as to the "National Rose Show," which was proposed by me at the last year's meeting of the society, that it may be quite as well for me to briefly state in this letter to you (as secretary of the association and member of the rose show committee) the facts as they have transpired, so far as my agency and experience in the matter is concerned. Should you desire to bring the subject before the meeting, you are quite at liberty to use this letter as you may deem proper.

During our visit to New Mexico, last winter, a wide-spread interest was created at Santa Fé, the present seat of government for that territory, where the project of our rose show became noised about. It so transpired that we were visiting there the Governor and Mrs. Prince, the former of whom was the vice-president and the latter the first lady member of the horticultural society of New Mexico. Both the Governor and Mrs. Prince manifested the liveliest interest possible, as well as entire confidence in the feasibility of the undertaking; so much so that they invited me, during my first week's stay with them, to repeat my paper upon the "Culture of the Rose in Private Grounds" in the drawing-room of the famous old gubernatorial palace there, to which they invited President Arthur Boyd, of the New Mexico Horticultural Society, and about fifty other guests to be present. It will please you to learn that all seemed impressed with the desirability of a national rose festival, and to be in sympathy and accord in a way to volunteer every possible co-operation in any future undertaking of that kind which we may decide upon. The following morning the Archbishop Salpointe, who is an aged man and something of a cripple by reason of rheumatism, sent his niece

as a messenger begging me to call upon him, as he was not only greatly interested in rose culture, but was desirous of listening to the plan and detail of anything looking to an American festival of this regal flower.

Archbishop Salpointe is the Catholic archbishop of Arizona, Colorado and New Mexico, and he possesses in Santa Fé, attached to the archbishopric mansion, magnificent rose gardens, the culture of which afford him the greatest pleasure and delight. My visit to him was attended with much satisfaction, as the good man took me through his fine gardens and voluntarily proposed planting some extra fine specimens of roses with a view to sending them to the Minnesota rose show.

The board of trade at Santa Fé hearing that I was especially interested in floriculture, very politely sent me a novel and attractive picture of the fruits and flowers of New Mexico, which may eventually find its way into the attractive rooms of the Minnesota society.

Continuing our journey, in course of time, we arrived at Hot Springs, Arkansas. I very soon cast about to put myself into acquaintance with the horticultural society of that rather unthrifty state. Very soon I learned that years before a society had been in existence, but the impression was, that the horticultural society of the state of Arkansas had (in Southern parlance) "*kind'er died out.*" But I found one energetic woman who was growing fine roses in Hot Springs, supplying the rotundas of the various hotels there; and after a long trip to her home in the suburbs, I at last found her in the Arlington hotel, personally superintending the arrangement and disposition of her posies.

She is the wife of Judge Kellam, a prominent man of the state, and she listened with intelligent interest and approval to the plan of a national rose show, expressing willingness and a strong desire to "be one" to represent Arkansas.

Madame Modjeska, the great tragedienne, who owns a fine ranch in California where she cultivates roses with pronounced success, has talked with me of our proposed show, making many inquiries, giving some valuable suggestions and a hearty assurance that she would be pleased to send us a glimpse of her famous roses when we get to the point of holding a rose show.

Mrs. John A. Logan, of Washington, D. C., perhaps the best known representative woman of our country, has both talked with and written to me with much enthusiasm upon the subject. Mrs. Logan pledges herself to see that the District of Columbia contributes its bravest roses to grace such an occasion, and hints that a choice collection from the famous conservatories of the White House may be forthcoming for such an auspicious event.

I saw in Boston, last spring, the World's Fair horticultural representative from Massachusetts, who gave me every assurance of a creditable showing of roses from the Bay State, and who volunteered as well to come out here with the collection and be present at the celebration, whenever we elect that it shall occur.

From Portland, Oregon, as well as from distant states in the far south, I have received letters of inquiry and encouragement; and in conversation last May, with Mr. John Thorpe in Chicago, who was at the head of the World's Fair horticultural exhibit, he not only spoke strongly in approval of such an undertaking, but remarked that "he had often thought of suggesting such a plan for his own state." So, my friends, it seems plain, that if we do not get up and act pretty soon upon our own idea, somebody else will; and thus, the prestige and honor of originality and leadership in this important field of beauty and profit will be lost to us entirely, as a state and society.

You have so many wiser heads than mine in your active society that it seems something of presumption to me, as I contemplate the situation as it appears from my standpoint, and perhaps still greater temerity, for me to suggest an opinion as to the final outcome of the proposition for a national rose show. But as I reflect that the honor

which the society conferred upon me one year ago, by placing me at the head of the rose show committee was not intended as an empty one, and as I accepted it in good faith and not as a mere figure-head, you will pardon me, if in language appropriate to our subject, I no longer "beat about the bush," but proceed briefly to present to you what seems desirable and possible, in connection with this interesting plan.

It is quite apparent to all that the hard times which have come upon us within the last twelve months, constitute for the time being a formidable obstacle to the formulating of any important undertaking involving money obligations of any considerable sum.

A national rose show would obviously need, to begin with, a reasonable financial guaranty from our citizens to cover expenses involved over and above possible receipts. There would need to be money in sight to invest in attractive prizes; for the outlay of transportation; to prepare circulars, and send them out; and above all, money to compensate some active man who could, and would, give his entire time and energies to bringing the affair to the attention of the societies of other states, as well as to prominent citizens everywhere who were in any way interested in the culture of the rose in private grounds.

While it is quite true that in the world of business everything seems temporarily at a standstill, I must confess to genuine admiration for the state of California which has marshalled her magnificent resources for the splendid Mid-Winter Fair at San Francisco, and for the beautiful Rose Festival of the state, which enthusiastic friends there write me is attracting wide-spread attention. In contemplation of the pluck and spirit of our California brethren, and with a realization of the truth of that homely old saying, that "we must creep before we walk," might it not be well, in view of the unavoidable present conditions pertaining to a national rose show, to do—next summer or whenever your society considers best—what the state of Minnesota has never yet done, viz: To hold here in Minneapolis, upon whichever date, and at whatever place seems most desirable, a *Minnesota Rose Festival*, given under the auspices of the society, the proceeds of which, over and above the necessary expenses for prizes, should be devoted to the beginning of a modest fund looking towards the erection of a horticultural building and hall in the city of Minneapolis?

Having demonstrated our ability to manage and push forward to success an attractive state rose show, we *might* be encouraged to undertake on a larger and grander scale, floral triumphs which would naturally supplement and grow out of a more modest undertaking.

I cannot bring this imperfect letter to a close, Mr. Secretary, without recalling the pleasure it afforded both Mr. Morrison and myself to welcome last winter this society to the hospitalities of Villa Rosa, and to couple with that remembrance the hope that we may be permitted the added pleasure of welcoming you all to our home in the summer of 1894, at which time I believe the society will again hold its session in this city. Please extend to the horticultural society the best wishes of Mr. Morrison and myself, with a hearty invitation to one and all, to pass the day of your session next summer under the "shade of our vine and fig tree."

Yours very truly,

MRS. D. MORRISON.

Mr. Elliot: It seems to me it is fitting that our society should take some action at this time in regard to this matter, and that it would be well for us to consider this proposition; and to that end I would make a motion that we accept the invitation of Mrs. Morrison to hold our summer meeting this year at Villa Rosa, and leave it with the executive committee of the State Horticultural Society to decide

upon the date at some future time. This motion was carried unanimously.

Mr. Latham: I want to say a word about the matter that was unintentionally omitted. I have had some talk with Mrs. Morison about this rose show. The details have been considered to such an extent that it seems as if there were a reasonable probability that it might be carried out. It requires further consideration, and it seems best that the matter should be left with the executive committee with power to act. I would make a motion that the matter of the state rose show be left with the executive committee with power to act. The motion carried.

Mr. J. O. Barrett: After the Minnesota Forestry Association received the courteous privilege to occupy a joint session with the Horticultural Society, I consulted with some of the members of our executive board and we concluded to invite representative parties from the lumber side who would address the people from their standpoint. I accordingly invited our fellow citizen, Hon. Platt B. Walker, a man thoroughly versed in that pursuit, to address us on this subject. I have also invited Hon. O. S. Whitmore, editor of "Hardwood," of Chicago, a gentleman who is thoroughly versed in the lumber business, who will address us this evening; and it is hoped that after these gentlemen have spoken there will be a full discussion of the subject, if it is thought proper to do so. I have now the pleasure of introducing the Hon. P. B. Walker.

Mr. P. B. Walker then read a paper on "A Voice of Warning from the Lumber Side." (*See index*.)

Hon. O. S. Whitmore, editor of "Hardwood," Chicago, followed with a paper on "Practical Forestry." (*See index*.)

A long discussion followed the reading of these papers.

The program being exhausted and the hour being late, the society adjourned until 9 o'clock Friday morning.

MORNING SESSION, FRIDAY, January 12, 1894.

President Underwood called the society to order promptly at 9 o'clock, and Mr. J. A. Sampson, Excelsior, offered prayer.

The subject of the morning session was apiculture, but before taking up the regular program, the committee appointed the day previous on the proposed city ordinance regulating fruit measures made its report through Alderman J. S. Gray, chairman.

Your special committee to whom was referred the proposed ordinance to establish a standard measure for the sale of small fruits, berries, peas, beans and nuts in this city, respectfully report that in the opinion of the committee the passage of said ordinance in its present form would be a great injustice to the fruit growers, not only of our immediate neighborhood, but to all who have heretofore shipped fruit to this city from the South, for the following reasons:

First, that there is a recognized standard of boxes used by nearly all fruit growers, said boxes being, to a large extent, already made for the season, all of which would be useless if the proposed ordinance is passed in its present form.

Second, that pint boxes are used by fruit growers for shipping tender fruits, such as raspberries, and are made shallow to avoid crushing. This object would be entirely defeated by using the pint box as per ordinance.

Third, that the change of size in boxes affecting all Southern fruit growers who ship to this city, said growers having their box material on hand at this time, would be to practically shut out all Southern fruit from this market and leave the fruit consumers unsupplied. We therefore recommend that the secretary of this society be instructed to request of the city council to strike out sections 3 and 4 of the proposed ordinance.

Signed—J. S. GRAY,
J. A. SAMPSON,
A. H. BRACKETT,
M. M. FRISSELLE,
WM. LYONS,
Committee.

DISCUSSION.

Mr. C. W. Sampson. I would like to say a word in regard to the ordinance which the city of Minneapolis has taken steps to pass. If it were passed it would be an injustice to the fruit grower and the consumer. I am only one out of a hundred, yet I would say it would shut us off from the Minneapolis market, and we would be obliged to use some other market. We have our boxes already ordered, or on hand, and some have a surplus left over from last year's stock. The same is true of Wisconsin and other states, and I consider it necessary in order to establish a certain grade to make the movement uniform throughout the United States. It want to say further that the horticultural society does not want to place itself on record as being against any just measure, and that we favor a United States law governing the manufacture of boxes, and that the regulation boxes be made to suit the demand. I wish to state also that it would be an injustice to the city, as it would shut us off from selling in the city, if our boxes were not according to the standard of the ordinance. It is unjust both to the city interest and to the fruit grower.

Mr. Pearce. The whole thing is imaginary rather than real. The only difference between the two measures is that our boxes hold just a pint liquid measure and the others are dry measure. There is just that little difference. The difference is so small that it does not amount to anything. The idea of establishing a different standard at once would be a loss of thousands of dollars to the whole country. A great many people have their boxes already made up and it would necessitate a change all around.

Mr. C. L. Smith. As an actual fact our berries are not sold by the quart, pint or bushel; nobody buys them in that way; they are sold by the box or by the case of 24 boxes. That is the condition in which they are marketed, and the man who buys does not ask how much a bushel, but he buys them by the box or by the case, and I simply want to say that we want nothing of the kind.

Col. Stevens. If this ordinance should pass it would, in my idea, banish all berries from our market. We have the best market this side of Chicago, and it is a great injustice to the producer, but to the consumer it is an outrage.

Dr. Frisselle. It seems to me I should quite agree with Col. Stevens. The fact is that the dealers in berries impose upon their customers when they sell, for instance, blueberries; they do not give

them a quart or a pint. They deal them out in wine measure. They have a tin cup which they say holds a quart. It is not the quart they sell by—they do not give their customers a quart; but, as Mr. Smith remarked, the dealers in berries which come into the market in cases are sold by the case and not by the bushel. I quite approve of that part of the ordinance which requires dealers to sell by the measure and to give full measure, but I do feel that if this proposed ordinance is passed it would be a great injury to the fruit dealers and growers.

Mr. Smith. I move that the secretary of this society be instructed to prepare a copy of the resolutions and forward immediately to Alderman Gray for use this evening.

The motion was seconded and carried.

At this point the morning's topic, apiculture, was taken up, and J. P. West, president of the Bee-Keepers Association, read a paper on the "Adulteration or Honey." (See *index*). A long discussion ensued.

A motion to appoint a committee suggested in this paper was carried and President West appointed as members of that committee Messrs. Danforth and Day.

The next matter taken up was the report of the committee on apiculture, presented by Mr. Barnett Taylor, Forestville. (See *index*.)

This was followed by a very interesting paper by Mr. Urie, Minneapolis, on the subject of "The Advantage of the Honey Bee to Horticulture." (See *index*.) Some discussion followed.

Mr. Urie here read an article by Prof. Cook of California. (See *index*.)

Mr. Barnett Taylor, Forestville, then read a paper on the topic of "Increasing the White Honey Crop and Finding a Market for it." (See *index*.) This was discussed at some length.

AFTERNOON SESSION, FRIDAY, January 12, 1894.

President Underwood called the society to order at 2 o'clock, and before the regular program of the afternoon was taken up, O. C. Gregg, superintendent of the Farmer's Institute made a very instructive and interesting address upon the horticultural work in the institutes.

Mr. Elliot: There was a matter brought up yesterday that was laid on the table. I refer to the report of the executive committee, and if it is in order that committee is ready to report.

Secretary Latham then read the report of the executive committee. (See page 503.)

President Underwood: This report was laid upon the table yesterday afternoon. It will be proper for you to make a motion to take it up at this time.

Mr. Elliot made a motion that it be taken up and considered, which motion was carried.

On motion of Dr. Frisselle the report of the committee was accepted and adopted.

Mr. Elliot: There is another matter that it would be well to consider at this time, and that committee is ready to report.

Mr. Elliot, as chairman, then presented the report of the committee on the president's address as follows:

Your committee heartily endorse the plan recommended by our president in giving premiums for new members and the formation of more local horticultural societies. The suggestion of issuing blank forms of organization by our society is a splendid one. Also topics for discussion would be of value. The plan in some modified economical form is well worth considering by our society. When our president referred to lecturers in our state work to represent the horticultural interests of our state he touched upon a most important point, for furthering the interests of fruit-growing. Our great drawback has been the want of lecturers that could go into the field and give the right instruction and impress upon the minds of our people that they were losing grand opportunities for bettering the conditions of themselves and their friends.

Our farmers' institute horticultural work has been ably sustained in the past by the efforts of some of the members of our society, but the time has come, we think, when we should have instructors in our art that are to the fore-front in all classes of horticultural work as instructors. The subject of the publication of our report as a monthly periodical to represent the interests of horticulture and the best interests of our society is a grand thought, and the more inquiry among our members and other educators is made, we find the consensus of opinion is that, if any feasible way can be provided, it should be brought about. The results, we think, would be very beneficial to our society and the public at large. We recommend that the subject be referred to the executive committee for further investigation, with full powers to act in the premises, and carry out this project if feasible.

Wyman Elliot. L. R. Moyer. M. M. Frisselle.

On motion of Prof. Green the report was accepted and adopted.

The society next listened to the report of the delegate to the Wisconsin and Iowa Horticultural Societies' meetings by J. S. Harris, La Crescent. (*See index.*)

J. S. Harris, La Crescent, then presented the report of the committee on entomology. (*See index.*)

Following this, the secretary read the report of the committee on ornithology by Frank I. Harris, La Crescent. (*See index.*)

President Underwood: Mr. Owen, of "Farm, Stock and Home" is with us this afternoon, and there has been a general expression from the society that they would like to hear from Mr. Owen.

Mr. S. M. Owen then stepped forward and addressed the society as follows:

Mr. President, this is unexpected, but it is a pleasure, nevertheless. I am gratified and complimented to know that anyone desires to hear anything from me at all. I am glad, too, that I have the opportunity to express a little of the admiration that I have always entertained for this society. I do not say this as a truckler in taffy, because that is not my style, but I do entertain a good opinion of your society and always have. I notice since I came in here how the young element is growing in this horticultural society. I remember I used to ask some of the old members, "What is the state going to do when you are dead?" Then they did not know, now they know that there is plenty of younger material to take their places.

I admire this society because of what it has accomplished in the way of growing fruit in this state. I was in California a year ago, and they told me what a grand country that was, and how easy it was to grow fruit. They expected to excite my admiration, but they didn't. I was like that man they tell about at Niagara Falls, who was taken

there by some friends to look at that great natural wonder. They pointed out the grandeur and the beauty of the falls, expecting to draw out some exclamation of wonder or admiration, but he looked at it as unconcerned as if it was an every day sight. Finally, they took him down at the foot of the falls and let him look up. They said, "Just look up at that great mass of water coming down. Is it not wonderful?" "Yes, I am looking at it, but don't see anything grand or wonderful about it." They said, "Look at it again, look at that water coming right out of the clear sky." "Yes, that is a fact, but what in thunder is to hinder it?" (Laughter.) So when they talked to me about raising fruit in California it did not excite my admiration at all. I told them they did not have to have the perseverance and intelligence that our horticulturists in Minnesota had. I said, "It is worth something to grow fruit in that country of ours. It does not mean anything at all to grow it here. Every fruit and flower means something in Minnesota. It means an immense amount of industry and intelligence has been expended to grow them." They took me into a place in Fresno and showed me a museum of fruit. It was wonderful—great piles of pears like squashes, peaches like pumpkins—but I have no admiration for it at all.

I listened to a paper here the other day by Mr. Akin, and he spoke of the flavor of the fruit you grow here; and I want to say that nowhere have I tasted fruit that can compare in flavor with that grown here. There is no excellence without great labor, and it is because you are compelled to put this intelligence, this patience, this application into fruit growing here, why the quality is so good. Where men grow up without any effort they never amount to anything. We can have nothing good without effort. I am proud of the fruit grown in this state, proud of what you are doing to grow that fruit, and if there is anything I can do personally or through my paper to co-operate with you and help on the good work you are trying to do here in Minnesota, I will gladly do so. I thank you kindly for your attention. (Applause.)

The committee on legislation, through Wyman Elliot, reported as follows:

Mr. President, we have only a report to make, just a mere mention, I might say, just to let you know that we have not forgotten you. The committee on legislation has to report that the demands for diffusing knowledge of horticulture to the people of our state are increasing each year, and we need means to accomplish that end, but we scarcely feel as if our society should take action towards asking an increased appropriation from the next legislature in view of the prospect of there being much larger demands upon our state treasury for money in other directions, coupled with the present financial stringency.

Mr. Harris: I believe this financial embarrassment is one of the levers we ought to use to induce the legislature of our state to give us an increased appropriation. The amount of fruit grown in this state amounts to more than it would cost to run this horticultural society for ten thousand years. If we had the means and could bring this knowledge before the people, they could raise annually thousands of dollars more than this appropriation would amount to, and I do not think the hard times ought to cut any figure against our urging the claims of the people of Minnesota in the next legislature.

President Underwood: I will say, ladies and gentlemen, that I am opposed to this consideration of hard times. I did not expect, for

several reasons, that our session this winter would be near as large in point of attendance and interest as it was last year, on account of the hard times, and that the members, probably, would not be able to come out to our meeting this winter, as they would not feel like giving the time and money; but I have been disagreeably disappointed, because we have come here under the most depressing circumstances and have had the largest meeting in the history of the society. If this society wants anything from the legislature it ought to be free to ask for it.

Mr. Wilcox: If it is in order, I would like to say this, that for years Mr. Harris has been urging the asking of larger appropriations, and for my part I wish that Mr. Harris could be appointed as chairman of the legislative committee, and authorized to go ahead and do the best he can. I do not know whether it is in order at this time to make a motion, and I do not know where the appointment of the committee comes from, but Mr. Harris should have the opportunity of trying to get an increased appropriation.

Mr. Harris: Mr. Harris does not wish for any honors; he is an horticulturist, and sometimes my wife thinks I think more of that old horticultural society than I do of her. She thinks if she were to die just before one of these meetings the funeral would have to be postponed until after the meeting. I believe we should talk with the candidates that expect to go to St. Paul and give them to understand that our influence is strong enough to control the legislature. I am in favor of keeping the matter stirred up all the time. If we do not ask for a thing, we shall not get it.

Mr. Barrett. I second the motion of Mr. Wilcox to put Mr. Harris on that committee. I see he is very confident of success. I think if he is appointed to that trust he certainly ought to have half of what he gets. I came through the mill and know what it is to be ground over. Do not put me on that committee, for God's sake; I will not accept it, if you do. (Laughter.) Representing as I did the Forestry Association, I could, of course, not do as well as if I represented the Horticultural Society. The Horticultural Society is ahead in popularity and I am glad of it, and it occurs to me that with such a man as brother Harris at the head and two other efficient men as the chairman might select, that with persistent effort and all sorts of honorable methods, I believe with a proper presentation of the claims of this society they can succeed in getting an increased appropriation. I spent an entire winter trying to get a bill through for the Forestry Association; sometimes it seemed hope was blighted entirely, but by keeping on working and praying, I succeeded in securing the appropriation.

The committee on obituaries reported through the chairman, Mr. Elliot. (*See index.*)

Mr. Elliot. I would suggest that if there are any of our members who have died during the year that we do not know of; that their names be forwarded to Col. Stevens; and it would also be well to take cognizance of any noted horticulturists that have died outside of our state in the United States and Europe.

The paper on "Bird Study," by Mrs. Louise Samson, Minneapolis, was then read by President Underwood. (*See index.*)

Prof. J. L. Dobbyn, chairman of the committee on final resolutions, then presented his report.

Resolved, That this society express its appreciation for the cordial hospitality shown its members during this meeting by the citizens of Minneapolis.

Resolved, That the thanks of the society is due to the owners of the Lumber Exchange building for the use of rooms during the sessions of our convention.

Resolved, That we thank Prof. N. E. Hansen of Iowa and Mr. O. S. Whitmore of Illinois and G. J. Kellogg of Wisconsin for their able addresses and valuable suggestions in connection with horticulture and forestry.

Resolved, That we recognize with satisfaction and pride the able manner in which the horticultural interests of Minnesota were represented at the World's Fair by our worthy secretary, A. W. Latham.

Resolved, That we thank the florists for their exquisite floral decorations donated to the society during the convention.

Resolved, That we recognize with pleasure and gratitude the worthy and successful efforts of the officials of this society to promote its varied interests.

Resolved, That our profound respect is due to "Farm, Stock and Home," "The Northwestern Farmer," "The Northwestern Agriculturist," "The Farmers Tribune," "The Progressive Age," and also the country press for their kind and efficient co-operation in popularizing our society.

Resolved, That we appreciate highly the courtesy and good taste of the daily press in reporting the proceedings of our sessions.

Resolved, That the hearty thanks of the society is due the regents of the university and the officers of the Experiment Station, under the supervision of Prof. S. B. Green, for their experimental work in the line of horticulture. And we urge farmers and gardeners to familiarize themselves with its work that they may avail themselves of its benefits.

WM. R. DOBBYN,
C. L. SMITH,
C. W. SAMPSON.

Mr. Chas. G. Patten(Iowa). I wish to claim your attention for just a moment. I wish to thank this society and its individual members for the courtesy they have shown me as representative of the Northeastern Horticultural Society of Iowa; and I wish to say that this society convenes the third week in November, at Mason City a place that is easily accessible to all from southern Minnesota. Our district embraces the one-fourth of the state of Iowa, in which the state experimental station at Ames is located, and we should be very much pleased, indeed, to meet the members of this society, and we extend you a hearty invitation to be with us.

Mr. C. Wedge. At the meeting of our local horticultural society, which has become an auxiliary to this society, we were under the impression that the members of our society would receive the reports of the state society upon complying with certain conditions, one of which was making a report, and another the sending of three delegates. We attempted to comply with those conditions, but according to last year's report only the three delegates are entitled to receive the reports. I hope it will be so arranged that members of auxiliary societies may receive these reports. I do not think we

detract anything from the membership of the state society. We have a membership of thirty, and I do not think one of them would have attended our state meeting or received the benefits from this meeting, except through the published reports. Our society, I think, has accomplished a great good in its way. Our proceedings were published in the newspapers of Austin; they published the papers read at that meeting. I hope this will be construed in some way so our members can receive the bound reports.

Pres. Underwood: I wish to say in closing our very interesting meeting that I want to return to the members of this society my sincere thanks for the courtesy they have shown me and the encouragement they have given me in presiding over the deliberations of this society; and I only hope that we may adjourn with the sincere determination that each one will take up the work in the interest of our society, so that when we meet again we can have a still larger membership and a still more enthusiastic meeting than we have had this year.

If there is nothing further to be brought before this society, I will now declare it adjourned sine die.

AWARD OF PREMIUMS

At the Annual Winter Meeting of 1894 of the Minnesota State Horticultural Society.

APPLES.

Articles.	Exhibitor.	Premium.	Amount.
Wealthy	A. H. Bullis	First.....	\$1.00
Malinda	"	Second.....	.50
Collection	D. Day	First.....	8.00
Wealthy	"	Second.....	.50
Malinda	"	First.....	1.00
Seedling.....	R. C. Keel.....	Second.....	....
Latest keeping variety	Wm. Somerville.....	First.....	....

E. H. S. DARTT, Committee.

GRAPES.

Agawam	J. R. Cummins	Second.....	.50
Collection	A. W. Latham.....	First.....	5.00
Concord	"	First.....	1.00
North Carolina.....	"	First.....	1.00
Herbert	"	First.....	1.00
Brighton	"	First.....	1.00
Duchess	"	First.....	1.00
Iona	"	First.....	1.00
Delaware	"	Second.....	.50
Collection.....	H. L. Crane	Second.....	3.00
Eumelan	"	First.....	1.00
Lindley.....	"	First.....	1.00
Agawam	"	First.....	1.00
Delaware	"	First.....	1.00
Brighton	Dr. M. M. Frisselle.....	Second.....	.50
Lindley.....	"	Second.....	.50

A. H. BRACKETT, Committee.

FLOWERS.

Collection of plants	E. Nagel & Co.	First	5.00
Single rose in bloom	"	First	1.00
Single geranium in bloom	"	First	1.00
Single begonia in bloom	"	First	1.00
Single carnation in bloom	"	Second .....	.50
Single carnation in bloom	"	First	1.00
Single orchid in bloom	"	First	1.00
Floral design	"	First	5.00
Collection of cut roses	"	First	2.00
Collection of cut carnations	"	Second	1.00
Collection of cut carnations	F. G. Gould	First	2.00
Table bouquet	E. Nagel & Co	First	2.00
Table bouquet	F. G. Gould	Second	1.00
Basket of flowers	E. Nagel & Co.	First	2.00

MRS. ANNIE BONNIWELL,

MRS. A. A. KENNEDY,

R. S. MACKINTOSH,

Committee.

VEGETABLES.

Early potatoes	C. W. Sampson	Second .....	.50
Onions	"	Second .....	.50
Turnips	"	Second .....	.50
Celery	"	First	1.00
Cranberries	"	First .....	...
Collection	J. R. Cummins	First	5.00
Carrots	"	First	1.00
Beets	"	Second .....	.50
Hubbard squash	G. Chandler	Second .....	.50
Cabbage	"	Second .....	.50
Beets	"	First	1.00
Parsnips	"	Second .....	.50
Early potatoes	S. S. Wentworth	First	1.00
Late potatoes	"	Second .....	.50
Cauliflower	J. A. Sampson	Second .....	.50
Collection, 15 kinds	H. F. Bussee	Second	3.00
Onions	"	First	1.00
Parsnips	"	First	1.00
Carrots	"	Second .....	.50
Celery	"	Second .....	.50
Hubbard squash	"	First	1.00
Cabbage	"	First	1.00
Cauliflower	"	First	1.00
Turnips	"	First	1.00
Late potatoes	"	First	1.00

J. S. HARRIS,

WM. G. BEARDSLEY,

R. A. LATHAM,

Committee.

PANTRY STORES.

Collection of canned fruits	Mrs. A. Bonniwell	Second	1.00
Collection of canned fruits	Wm. Lyons	First	2.00
Collection of jellies	"	First	2.00
Collection of pickles	"	First	2.00
Sorghum syrup	Mrs. A. A. Kennedy	First	2.00
Sorghum sugar	"	First	2.00

MRS. L. R. MOYER, Committee.

HONEY.

Comb	Wm. Urie	Second	2.00
Extracted	"	First	3.00
Comb	J. G. Bass	First	3.00
Extracted	John Turnbull	Second	2.00

E. R. POND, Committee.

DISCUSSION ON IRRIGATION.

Prof. W. W. Pendergast: I do not know that I shall be able to be here again, and there is one thing I wish to speak about, and my experience has been a little peculiar. A great deal of the loss of apple trees that is attributed to the winter should be charged to drouth. Where I live at Hutchinson, there is about a foot of very fertile soil, underneath which is a very coarse gravel that runs down about thirty feet. The soil is almost dry. If it should rain every day during the summer it would be none too wet. My experience during twenty-five or thirty years is that I could get nothing through the winter. I tried six or seven different kinds of currants, but they would all die, except the Red Dutch. Apple trees would do the same—the Yellow Siberian is an exception. I set a row of silver leaf maple and they grew up to be thirty to forty feet high, and one year when it was very dry in the fall every one killed. The box elder is one of the hardiest trees we have, yet one-half of my box elders killed one winter three years ago. Now I have got an artesian well in my garden. Since I have that artesian well, I have no trouble with winter killing. My currant bushes go through the winter all right, and so it is with everything that killed before. I give my parsnips and salsify a good watering in the fall, and they come out all right in the spring, but they would not do it before. It seems to me more attention should be given to planting our orchards on ground that will stand drouth well. That will obviate much of the difficulty. It is the dry late falls that do the mischief. I would like to know if the experience of others compares with mine.

Mr. J. A. Sampson: You take a dry spell in the middle of the summer and it will check the growth of a tree; then later it will take on a new growth, and the wood will not ripen, when it is apt to kill in the winter. If irrigated, the tree ripens its growth and lives through the winter.

Prof. W. W. Pendergast: I examined some maple limbs, and by their appearance no one would have suspected that they were dead, but cut them in two and I found the wood was fully seasoned to the very core, just like firewood. There was too little sap in the tree. I have had ash leave out as late as July. That tree has remarkable power of recovery from any backset of this kind. Sometimes they will begin to leave out late in the spring and by the last of June will be in full leaf.

Mr. E. H. S. Darrt: I have no doubt that drouth is one of the worst enemies we have to contend with. Drouth does not operate alone in the summer. Things freeze dry. You know how quickly the clothes on the line will freeze dry, and I think it is the same kind of freezing dry that kills the trees. They freeze so dry that when summer heat comes it continues the dryness, and the result is that the trees die.

Mr. Wm. Somerville: There are several conditions to be observed in setting out trees in Minnesota. In the section of country I live in, we have a heavy clay subsoil, and it is not essential to put water around the trees in the fall of the year, but it is essential to

put heavy mulching around the trees in order to retain the moisture in the soil. I have had some experience in southwestern Minnesota with such soil as Prof. Pendergast has spoken about. It is absolutely necessary to wet the soil around the trees in the fall of the year. In the west they have had a hard time to raise trees, just because they would kill, or starve to death, for want of water. We can set out trees much easier and expect them to grow, where we have a heavy clay subsoil that will retain moisture. If the soil leaches out the trees will die without a great effort on the part of those who raise them. There is great trouble in setting out trees on the prairie; people undertake too much; they will set out several acres at a time. They would set them out and think they would grow and take care of themselves, and the result has generally been a failure. The worst place I have every seen in Minnesota, the hardest place I have seen, is in the vicinity of Brown's Valley. I think that is one of the hardest places to raise trees in the country, yet it has been done there by a few people who would set out several trees at a time; but where they set out several acres at a time, the result has been a failure pretty nearly in every instance.

Mr. J. O. Barrett: Mr. Somerville refers to the locality where I live. My tree claim is on the exposed prairie, exposed to the winds and the summer sun. I have one of the best timber claims in the whole vicinity, in the whole region round about. I have to expend a great deal of care on my tree claim. I presume I have sunk not less than a thousand dollars on my farm, and a large percentage of it was on that tree claim; but by repeated planting and proper methods of cultivation, I have made it a grand success. I have learned by hard knocks that it is useless to put a tree in the ground when the ground is dry, anticipating that it will thrive. I believe in Prof. Pendergast's idea of having the soil in proper condition. In the winter the plant has some circulation, even when it is frozen; and even when the tree is frozen solid it has a circulation to some degree; if it has no moisture it perishes. That leads to the great problem of irrigation in Minnesota. When we have surface irrigation in Minnesota, we shall raise not only fruit trees but all kinds of trees. I do not want you to get the idea, Mr. Somerville, that Brown's Valley is a hard place to live in. When our people understand what to do, we shall make a success of it.

Mr. Wm. Somerville: A man can raise trees anywhere, but they must have the proper care; that is what I meant by what I said.

Pres. J. M. Underwood: I want to be allowed to say a word in regard to this matter of irrigation. Some of you did not hear the paper on irrigation from Mr. Emery. Mr. Emery left here several years ago for Montana, where he has been so much impressed with the value of irrigation that he thinks it might be applied in Minnesota with good results. He talked to me a great deal about it this summer, and that is the reason this paper was brought out. There is no doubt there is more damage done to horticultural interests through drouth than through anything else. We call it winter killing; but it is drouth, and nothing else, in my estimation.

NOMENCLATURE AND CATALOGUE.

J. S. HARRIS, LA CRESCENT.

So far as concerns our own state, your committee has very little to add to the report submitted to you at our last annual meeting. The year 1893 was not a fruitful one for Minnesota orchards; but a very few varieties of apples have even a light crop, and a great many others not enough to make comparisons, or none whatever, and on that account we have not found opportunities for work and did not deem it advisable to make any researches in that line. Also, no state fair was held, and that deprived us of one of the most favorable opportunities for making observations and comparisons; and at such local and county fairs as we were privileged to attend, the exhibits were meager, and not very much that was new came to our notice. We had hoped to sift out and establish the correct names of some of the Russian varieties that were alluded to in our report last year—especially in the Oldenberg and Hibernial families—but have not been able to do so.

When at the World's Fair, Prof. J. L. Budd, of Iowa, called our attention to a large and fine exhibit of the Recumbent, or Leiby, from Washington. This is one of the Hibernial family and, as we have seen it before, so near like the Hibernial that we have believed it to be identically the same variety. But if the fruit in this collection is correctly named, unless growing on the soil and in the climate of Washington produces a marked change in their appearance, we shall be compelled to acknowledge that it is a different and, in some respects, a better variety than the Hibernial. In the course of our explorations for the U. S. Division of Pomology in 1892, we came across two varieties in the orchard of Wm. Oxford, of Houston county, where the trees had been purchased as Russians, without other names, that for apparent hardiness, productiveness, quality and appearance of fruit impressed us as having considerable value for planting in southern Minnesota. We sent specimens of the fruit to Prof. Budd and to the Division of Pomology for a name. One variety Mr. Budd pronounced to be of the Anisim family, and probably the 18 m, and the other could not be identified, and for the present will be known as the Oxford Orange. Later in the season we saw the Anisim, or what we should judge to be the same variety, at Andrew Peterson's, Waconia, and on the Experimental Farm at St. Anthony Park, Minn., under the name of Good Peasant. They have since been rechristened Anisim. In the last autumn we saw the same fruit at the World's Fair shown under the name of Zusoff. This is noted to show some of the difficulties that will be encountered in learning the correct names of some of the varieties of Russian apples and having them propagated and sold under that name.

The description of the fruit in question is:

Anisim.—Size, medium; form, flat-conic, often oblique; color, a greenish-yellow, almost entirely covered with stripes and splashes of deep red under a bluish bloom; stem, medium short; cavity, medium, slightly russeted; calyx, small, closed; basin, shallow, slightly

corrugated; flesh, white, fine-grained, tender, juicy, mild acid; core, small, closed; seeds, plump; season, November and December; tree, upwright grower and heavy bearer on alternate years.

The Oxford Orange is of medium size; smooth, rounded form, tapering towards the eye; color, light yellow, generally with a dull blush in the sun; stem, medium in a narrow, medium cavity; calyx, closed in a shallow basin; flesh, light yellow, fine-grained; sub-acid flavor; season from latter part of November to January; tree regular bearer.

As we have stated in former reports, the nomenclature of the fruits grown in this state is in a chaotic condition. The Russian varieties were generally first introduced under numbers to correspond with some often unpronounceable name, and many of them have since acquired names for exhibition purposes to take premiums that chanced to be offered at fairs. Many of the American varieties are not kept under their correct names by the average planters, who secure names for them from travelling tree venders, no better informed than themselves. We cannot make such advances as we ought in establishing a reliable pomology for the state, until the names of our fruits are straightened out. There are a variety of the newer Russians on trial in the state, under numbers, without names or with incorrect names, that no doubt will prove very valuable; but when shall we know which and what they are? Who will know what he is planting if the variety is known by a different name in every locality, or different varieties are known by the same name? Had advantage been taken of it, the late World's Fair afforded the best opportunity that has ever been known for studying and comparing the fruits of North America—for tracing out and finding out the legitimate names and noting the variations of varieties in widely different localities. So far as we have learned, most of the states let this grand opportunity pass by without improving it, and we are very certain that our own state horticultural society has neglected to profit by it. We visited the fair in June, August and October. In October, the exhibition of such fruits as we do or hope to produce in Minnesota, was at its best, and we saw and learned many things that would be of great advantage to our state had they been seen and learned by some of our enterprising young members, and we regret that at least one such could not have been kept there during the entire season. We have no additions to the catalogue published in the last report, but recommend that it be revised, corrected and published in the forthcoming volume of transactions.

**ANNUAL MEETING OF WISCONSIN STATE HORTICULTURAL
SOCIETY, FEBRUARY, 7-9, 1893.**

REPORT OF DELEGATE, J. S. HARRIS.

Mr. President and Horticultural friends:—I have been your delegate to the meetings of the Wisconsin society so many times that I feel a great deal more like one of their old members than like a stranger sent down to take notes and pick up and bring back to you things useful or ornamental; in fact, by a unanimous vote of the society I find my name enrolled in the list of honorary life members, and now when I meet and have a cordial hand shake with those old pioneers and veterans of horticulture, Smith, Hobbins, Stickney, Tuttle, Adams, Phenix, Wilcox, Pepper, Plumb, Springer, Kellogg and others who laid the foundations of pomology in that state, I feel almost that I am one of them, and like using the terms *we* and *us*. These men are heroes, whose names will be revered, whose memories will be cherished by future generations. I cannot help but feel that the influence of these men has extended beyond the borders of their own state and across the river that separates us and has made our work lighter and brighter.

The meeting, as above, was held in the library room of the society, which is one of the pleasantest rooms in the Capitol at Madison, and answers the purpose well as an assembly room; besides affording very good facilities for the usual exhibition of fruits. At times, when the legislature is not in session, the exhibits are generally set up in some other room, which is in some respects an advantage, because considerable numbers of people are coming in to see the fruit who take no particular interest in the meeting, making some confusion.

The meeting opened Monday morning with President M. A. Thayer in the chair, and continued three days, with three long and interesting sessions each day. Several of the best papers read were by the younger members, showing very plainly that the society will still live and may have standard bearers even after the last old veteran has passed over to the other side of the river to enjoy his rewards. Among the best of the papers was a "Start in Horticulture," by C. E. Tobey, of Sparta. He started out by saying: "One of the many regular cries that comes from those who are not familiar with the bright and winning side of any undertaking is, 'If I had known the possibility of success there is in the berry business five years ago, I would have had four or five acres in full bearing before this, but it is too late now.'" The writer maintained that it was never too late for the intelligent worker to procure his share of good things of this earth, which the study and practice of horticulture offers to one and all. He told the audience very lucidly how to make a start in horticulture, and gave good advice to the beginner.

Another sterling paper, "The Strawberry from the time of Setting Plants to Harvesting," was read by E. J. Scofield, of Hanover, telling what kind of plants to plant, how to prepare the plants for setting, and how to set them; about cultivating, when to cut runners, winter covering, mulching, picking, marketing, etc.

Another good paper, by a young member, that would apply equally well to our state was, "How to Grow Apples," by J. J. Mann, of Norwalk. He attributed the failures to be caused, to a consider-

able extent, by our changeable winters, poor locations, non-adapted varieties, poor or no culture and making pastures for stock of our orchards. He told what kind of a site to select, how to fit the ground for planting, what varieties and kinds to plant, and how to plant and care for them, and the general management that with him brought success. Among other things was to guard well against mice, rabbits and insect enemies.

One of the best papers presented was, "Hardiness versus Quality," by Prof. E. S. Goff, of the Agricultural College and Experiment Station, in which he repeated the arguments of some that it was against a law of nature that the best quality of fruits could ever be grown in these northern latitudes, because great hardiness and superior quality could not exist in the same variety. A very animated discussion followed the reading of the papers, but the majority believed with Mr. Goff that a hardy race of fruits could be originated for this climate without the sacrifice of quality.

More than usual attention was given by this meeting to the subject of forestry. Cranberries were pretty thoroughly discussed. Altogether the meeting was a great success and the attendance much larger than the average.

The election of officers resulted in retaining M. A. Thayer, president, and B. S. Hoxie, secretary. Visiting delegates from other states were M. J. Wray and W. A. Burnap, Iowa, O. F. Brand and J. S. Harris, Minnesota, and a good representation of agricultural press reporters from Chicago, Ill.

The exhibition of fruit was not as large as it has been on some previous years, owing to the very general failure of the crop from leaf blight and scab in the lake shore region, which usually furnishes a good share of the longest-keeping varieties. There was a very good exhibit of new seedling apples. Sixteen varieties were shown by Wm. Stammers, of Ontonagon county. Some of them were very fine. One variety by O. C. Cook, of Oconto county, were fine specimens and choice desert fruit. The original seeds were supposed to have been planted by French or Indians, about fifty years ago, in Marinette county. The size is four by our scale; form, round oblate; color, ground light yellow, splashed with varying shades of red; flesh, very white and fine grained; flavor, excellent. Three good seedling varieties were shown by F. H. Chappel, of Oregon. All averaged about size five and showed good keeping qualities. Four seedlings of the Alexander were shown by Wm. A. Springer, of Fremont, and one choice dessert apple and a good keeper was shown by Phillip Watrus, Wezanweya, Wis. Size three.

RECORDS OF EXECUTIVE COMMITTEE.

RECORD OF MEETINGS OF EXECUTIVE COMMITTEE DURING 1893.

Meeting held at Lumber Exchange, Minneapolis, Jan. 13, 1893.

All the members were in attendance. The following bills were audited:

C. W. H. Heideman, expense as delegate to South Dakota Horticultural Society.....	\$22.75
J. M. Underwood, railway fare to annual meeting.....	2.75
J. S. Harris, expense executive committee.....	8.25
O. F. Brand, expense executive committee.....	7.19
Mrs. Jennie Stager, expense of vice-pres. to annual meeting....	4.00
Adjourned sine die.	

A. W. LATHAM, Secretary.

Meeting held at the residence of Mrs. Dorillus Morrison, January 13, 1893.

All the members were present. As directed by the action of the society, a committee of three, consisting of Mrs. D. Morrison, Wyman Elliot and A. W. Latham was appointed to examine into the practicability of holding a national rose show in Minneapolis in 1894, to report to the executive committee at a convenient date.

Adjourned sine die.

A. W. LATHAM, Secretary.

Meeting held at the society library, Feb. 15, 1893.

The committee convened at 10:30 a. m., all the members being present except Prof. S. B. Green and O. F. Brand, and proceeded to appoint standing committees for the current year. (For the list see the report of 1893.)

Adjournment was then taken for lunch.

Re-convening at 2:00 p. m., Prof. S. B. Green was in attendance in addition to those present in the forenoon. The following resolution was unanimously adopted:

Resolved, That we are not in favor of the repeal of the tax levy made in the interest of tree planting, as proposed in a bill introduced into the lower branch of our legislature, believing that its repeal would discourage needed planting of trees on our open prairies. We respectfully ask that the tree bounty law remain intact to advance the practical interests of forestry.

Upon motion the chairman of this committee was authorized to audit the bill of the shorthand reporter at the late meeting, when presented.

Plans under discussion pertaining to the free distribution of strawberry plants to the children of the state, and to the offering of premiums to new members of the society, were referred to a sub-committee consisting of J. M. Underwood, Wyman Elliot and A. W. Latham, with power to act.

Chairman Wyman Elliot being called away, J. S. Harris was elected chairman pro tem.

The following resolution was adopted without dissent:

Resolved, That the executive committee of the Minnesota State Horticultural Society heartily endorse the project of an exhibit of the

products of the state at the next annual Minneapolis Exposition, and approve of an appropriation of \$5,000 by the state legislature to aid in paying the premiums for the same.

The following bills were ordered paid:

Clarence Wedge, expense as delegate to Iowa meeting.....	\$11.50
L. H. Wilcox, expense executive committee in 1892 and 1893....	10.00
Dewain Cook, expense vice-president.....	8.46

It was decided to hold the next summer meeting at the State Experiment Farm.

Adjourned sine die.

A. W. LATHAM, Secretary.

Meeting held at the society library, at 2 p. m., June 27, 1893.

Meeting was called promptly by the chairman, all the members being present except L. H. Wilcox. Minutes of last meeting were read and approved. Report of Mrs. D. Morrison, chairman of committee on National Rose Show, was read and accepted. It was decided to postpone action thereon.

Prof. S. B. Green was instructed to investigate the matter of amounts which may be due the society through the State Agricultural Society for the payment of premiums, and report later.

The following accounts were audited and ordered paid:

A. W. Latham, postage.....	\$79.90
J. S. Harris, expense executive committee.....	15.20
O. F. Brand, expense executive committee.....	4.14

Adjourned sine die.

A. W. LATHAM, Secretary.

RECORD OF MEETINGS OF EXECUTIVE BOARD DURING 1894.

Meeting held in Lumber Exchange, Minneapolis, Jan. 10, 1894.

All present except O. F. Brand.

The following bill was audited:

Ditus Day, expense as treasurer, \$9.39.

The accounts of the treasurer for the year ending Jan 10, 1894, were examined and found correct.

Adjourned to 9 a. m., Jan. 11, 1894.

A. W. LATHAM, Secretary.

Meeting held in Lumber Exchange, Minneapolis, Jan 11, 1894.

All the members were present.

The following recommendations were adopted for presentation to the society:

(1.) That the salaries of the officers for this year be the same as they have been in the past year, viz., president, \$25; treasurer, \$25; secretary and librarian, \$600; assistant librarian, \$15; and that the expenses of the executive committee be paid to the place of meeting. (2.) That \$100, or so much thereof as may be necessary, be appropriated to pay the expenses of the stenographer in reporting this meeting of the society.

Adjourned to 9 a. m., Jan, 12.

A. W. LATHAM, Secretary.

Meeting held in Lumber Exchange, Minneapolis, 11 a. m., January 12, 1894.

All present except Prof. S. B. Green. The annual accounts of the secretary were examined and approved. The following bills were audited and allowed:

O. F. Brand, expense of executive committee.....	\$9.60
L. E. Day, expense of vice-president.....	1.55
L. H. Wilcox, expense executive committee.....	6.00

Adjourned sine die.

A. W. LATHAM, Secretary.

Meeting held in Lumber Exchange, Minneapolis, Jan. 12, 1894.

All present except Ditus Day. The following bills were audited:

J. S. Harris, expense as delegate and as member of executive committee.....	\$39.35
R. S. Mackintosh, expense of vice-president.....	1.75

The subject of publishing the annual report as a monthly periodical was considered, and a committee consisting of Wyman Elliot, A. W. Latham and S. B. Green was appointed with full power to act in the premises.

Messrs. J. M. Underwood, J. S. Harris and A. W. Latham were appointed a committee to prepare a plan to be used in organizing local societies through the co-operation of the school district officers.

R. C. Keel was appointed a delegate to the forthcoming meeting of the Wisconsin State Horticultural Society.

It was unanimously resolved to officially endorse the "Handbook of Horticulture" by Prof. S. B. Green, now being published by "The Farm, Stock and Home."

Adjourned to 9 a. m., Jan. 13, 1894.

A. W. LATHAM, Secretary.

Meeting held at the library, Jan. 13, 1894.

Meeting convened at 9 a. m., all being present but Prof. S. B. Green. The appointment of superintendents of experiment stations of the preceding year was renewed, subject to revision by Prof. S. B. Green.

The annual working committees for 1894 were then appointed. (For list see report of 1894.)

The subject of a state rose show was considered and the president of the society was authorized to appoint a committee to co-operate with him in the matter, and power to act was given them.

It was decided to rent the back office of Elliot and Metcalf as a library and office for this society, to be used in common with them as a private office for one year, at a rental of \$10 per month.

Adjourned sine die.

A. W. LATHAM, Secretary.

Meeting held at the residence of D. Morrison, Minneapolis, Jan. 21, 1894.

All the members were present. The secretary was authorized to procure more advertising for "The Horticulturist" at his discretion.

Adjourned sine die.

A. W. LATHAM, Secretary.

Meeting held at the office library, June 22, 1894.

Messrs. Elliot, Andrews, Harris and Latham were in attendance. The accounts of the secretary's office from Jan. 9 to June 20, 1894, were examined and found correct, and his bill of \$669.43 was audited and allowed.

Adjourned sine die.

A. W. LATHAM, Secretary.

Meeting held at the Minnesota State Fair, agricultural building, Sept. 13, 1894.

Messrs. Elliot, Green, Harris, Andrews and Latham were present. It was decided to leave all matters pertaining to the location of and program for the coming winter meeting to a committee consisting of Pres. Underwood and Messrs. Elliot, Green and Latham.

The following account was audited:

J. S. Harris, expenses of executive committee..... \$10.16

Adjourned sine die.

A. W. LATHAM, Secretary.

LIST OF ANNUAL MEMBERS, 1894.

Aspinwall, N. P.	Harrison	Crane, H. L.	Excelsior
Akin, D. F.	Farmington	Colgrove, J.	Clearwater
Aschenbeck, J. H.	731 4th ave. N., Minneapolis	Clarke, N. P.	St. Cloud
Ayers, H. B.	Carlton	Crawford, M.	Cuyahoga Falls, O.
Andrews, J. P.	Faribault	Collar, E. L.	Vermillion, S. D.
Aldrich, O. C.	Morristown	Crickmore, Robt.	Owatonna
Adelman, Wm.	Richfield	Chambers, William	Havana
Aiton, J. M.	St. Peter	Corbett, Prof. L. C.	Brookings, S. D.
Abbott, C. A.	Saratoga	Clapp, H. A.	Rochester
Ames, E. D.	Lyle	Crosby, F. M.	Hastings
Anderson, Nils	Lake City	Cutting, A. L.	Byron
Ahrens, Chas.	Brainerd	Chase, Rev. E. B.	Lake City
Addison, Bert W.	Walnut Grove	Cook, M. W.	Rochester
Anderson, A. H.	Eden Prairie	Cass, Geo. J.	Portland
Austin, Hon. Horace	306 N. Y. Life, Mpls	Cartford, B. H.	Watertown, S. D.
Anderson, Erik	Lake Park	Cutts, E. J.	Howard
Austin, L. E.	Glencoe	Cewe, Jacob	Dakota, Minn.
Brand, F. R.	Faribault	Chamberlain, F. A.	Security Bank, Minneapolis
Buck, Willard	Alexandria	Cummins, O. L.	Washburn
Blair, C. L.	St. Charles	Crandall, W. W.	Sumter
Brand, N. F.	66th st. N. E., Minneapolis	Clutton, C.	Watertown, S. D.
Brand, A. M.	Faribault	Clow, H. S.	Dakota
Bonniwell, Mrs. Annie	Hutchinson	Church, J. P.	Lake City
Brackett, A. H.	N. Y. Life, Minneapolis	Coons, F. A.	Lake City
Bussee, H. F.	Station "A", Minneapolis	Crandall, C. B.	Red Wing
Brewster, Prof. H. W.	St. Anthony Park	Cary, L. N.	Mandan, N. D.
Bastion, J. J.	St. Louis Park	Cook, Dewain	Windom
Bradford, P. F.	Empire	Coffin, W. F.	Hamline
Bunnell, M. C.	Newport	Corlett, J. E.	Farmersburg, Ia.
Bishop, A. C.	Bloomfield	Day, L. E.	Farmington
Bass, J. G.	Hamline	Dav, H. M.	Farmington
Barrett, J. O.	912 Wright blk, Minneapolis	Doudna, J. M.	Alexandria
Brand, J. S.	Faribault	Danforth, Wm.	Red Wing
Bassett, L. B.	Rushmore	Day, Ditus.	Farmington
Bisbee, John	Madelia	Dampier, Wm.	20 W. 3d st., St. Paul
Bullis, A. H.	Winnebago City	Dawson, Chas.	400 Sibley st., St. Paul
Blackwell, Mrs. J. W.	Fort Totten, N. D.	Doughty, C. M.	Heron Lake
Beardsley, W. G.	St. Louis Park	Durrell, J. J.	Beaver Falls
Bufferding, Wm. H.	125 Plymouth ave., Mpls	Dresbach, M. P.	Dodge Center
Broughton, A. L.	2626 Polk st., Minneapolis	Deletrez, G. F.	Fort Benton, Mont.
Beardsley, B. F.	113 Endicott Arcade, St. Paul	Dedon, W. S.	Taylor's Falls
Buttermore, E. H.	Lake City	Doughty, J. Cole	Lake City
Brown, C. F.	St. Peter	Dennis, A. B.	Cedar Rapids, Ia.
Broman, August	Atwater	Dillman, Geo. C.	Sleepy Eye
Brown, C. E.	Richfield Center	Dunton, H. J.	Clearwater
Brown, Mrs. J. H.	Lac qui Parle	Day, J. S.	Raymond
Busch, Fred	Richfield	Davidson, J. D.	Alma City
Broberg, Theo. O.	Waconia	Davidson, R. E.	Alma City
Barrett, N. W.	Clearwater	Davidson, Mrs. Abbie	Alma City
Brunson, W. A.	Brownsville	Dean, W. E.	Tyler
Bailey, H. E.	Breckenridge	Davis, Mrs. Ida B.	Rockville
Bush, A. K.	Dover	Ellingson, E. L.	Bloomington Ferry
Brownlee, D. G.	Blue Earth City	Ensberg, S.	Toronto, S. D.
Blomquist, Oscar W.	Spencer Brook	Engberg, Rev. E. O.	Cambridge
Bedford, S. A.	Brandon, Manitoba	Ervin, H. C.	St. Cloud
Berg, Mrs. Helena	Sauk Rapids	Frankland, Thos.	Stonewall, Manitoba
Barnes, W. K.	Alexandria	Fuller, G. W.	Litchfield
Boodleston, B. J.	Ortonville	Frisselle, Dr. M. M.	Eureka
Brum, W.	Rowland	Fulsom, S. H.	529 2d ave. S., Minneapolis
Brynildsen, Jac.	Graceville	Furber, J. T.	Madelia
Bevers, W. F.	Zumbrota	French, W. S.	Slayton
Beckley, M. P.	New Paynesville	Frazier, Wm.	Sparta, Wis.
Barber, C. F.	81 Arthur ave. S. E., Minneapolis	Fullerton, Mrs. O. A.	Montevideo
Berg, C. O.	Zumbrota	Fuller, J. F.	1104 8th st. S. E., Minneapolis
Bost, A. A.	Excelsior	Fiedler, F. H.	Fergus Falls
Benison, Henry	Wabasha	Frenn, P. J.	Red Wing
Barton, Mrs. I.	Excelsior	Friedrickson, Lurs.	Cobden
Bailey, N. G.	Delavan	Fletcher, Wm. H.	Sauk Rapids
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 Marshall P. Wilder, Boston, Mass. 1886
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 R. L. Cotterell, Dover Center. 1891
 E. Wilcox, Trempeleau, Wis. 1894
 Philip Herzog, Minneapolis. 1894
 J. M. Smith, Green Bay, Wis. 1894
 Geo. P. Peffer, Pewaukee, Wis. 1894

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